

Succour to Indian industry by sharing scientific and social information

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That the post-GATT India, and in the wake of liberalization, is going to face a number of problems is now a cliché. What can be new is only the kind of problems and hopefully, specific solutions. Both of these tend to be the imported versions grafted on to us, since we are importing the notion of a free market economy. This note however concerns one very indigenous problem: what is the support the government and people can offer industry by way of legislation? Curiously, the matter falls well within the scope of the scientific community. It concerns sharing of critical information and the need to avoid unfair odds in legislation.

Firstly, *what* legislation and *what if* legislation. We will concern ourselves with very specific, avant garde newer technologies and our particular interest is biotechnology. There is a direct correlation between the degree of regulation on an industry and its profitability in this class of technologies in the West. Among the various biotechnology sectors, for example, there is a clear hierarchy of profitability (Figure 1). There is a sharp divide in the profitability between environmental,

service and supplier companies on one hand and the agricultural biotechnology and pharmaceutical companies on the other¹. This is largely a consequence of the strict regulatory machinery the latter have to go through. Legislation is the matrix in which regulation operates.

Legislation is in the domain of public action. Issues are as often popular as they are technical. The division is often blurred. Most importantly legislation can be a weapon wielded to humble the targets into submission² which is also the time honoured route. It appears that India will increasingly be the base of newer industries, (will the emphasis shift from cheaper manpower to cheaper brainpower?) which will attract restrictive legislation as surely as fruits attract flies. We may need to develop a far more professional attitude to legislation than hitherto envisaged. Legislation need not be endogenous but can be imposed on us by way of international agreements and even pressure groups.

To legislate, we need information on what is desirable and what is not, a distinction not always feasible. What we need is to find the intermediate gray level. That requires both information and

debate. Take the case of following industries: alcohol, even soft drinks including coffee and tea, tobacco, pharmaceuticals and nearly any biotechnology particularly the genetically engineered materials. It would always call for risk analysis³ of some kind or the other to help make up our minds as to what we keep and what we restrict or ban. The information is two fold: one relates to the industrial data, how much cost and how many sold etc. which is public knowledge. The cost benefit analysis includes the employment and profits generated on one hand and the harmful effects of the process as well as of the products on the other. This information is often of two kinds, one from the public institutions such as national data-collecting agencies and the other from investigators from national institutions including universities. There is parallel information that the industry collects and owns as part of its commercial activity and, it being private, may not concern us immediately unless it generates debate of public interest.

The information processed by public institutions primarily forms the scientific basis of legislation of any kind. Should smoking be banned in public places? Legislation is warranted when based on some definitive report that passive smoking offers a finite unacceptable level of risk. Also it is easy to legislate but difficult to implement. Therefore, legislation depends on either a scientific study defining the risks or a public outrage that cannot be ignored. The latter is the will of the people, as in the case of country liquor. The public will has to be respected in a democracy. Should strategically placed private will be supported in the absence of scrutiny of the data, if there are scientific pretensions?

Our contention is that the government and the industry should have equal access to all the critical data bases (in census, econometrics, epidemiology and health, productivity, etc.) wherever legislation is contemplated for industry and allow independent scrutiny and wide debate. Issues are not always as clear as in the case of whether heroin should be banned. Internationally, legislation is going to be a major weapon in the curtailment of

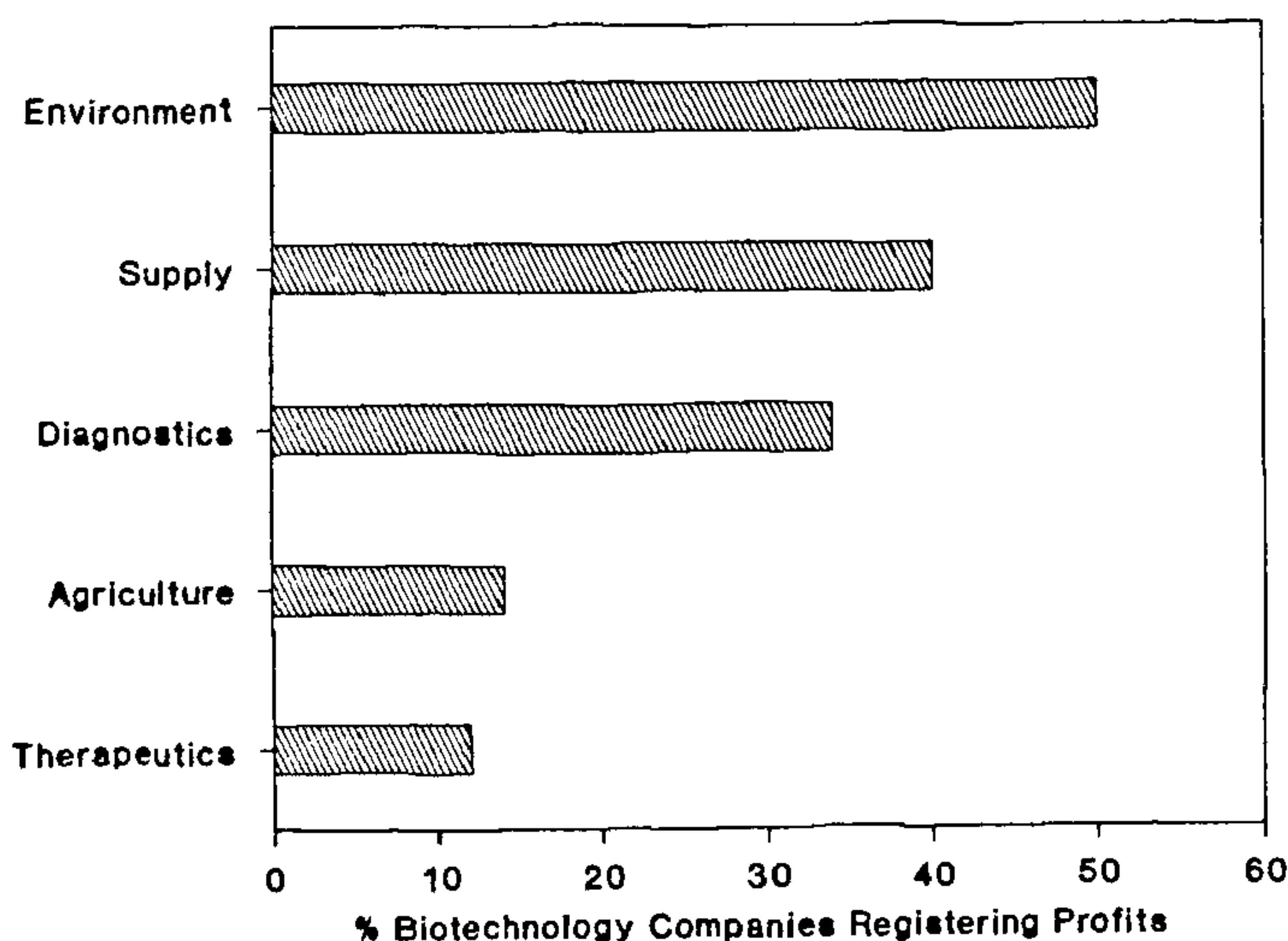


Figure 1. Prosperity of new technologies, such as biotechnology, measured in terms of per cent units that became profitable in each sector of biotechnological activity. The drug and agricultural sectors, which are heavily regulated, have had profits less often than those which are not¹.

growth of industry⁴ and not always for the right reasons. We have now accepted, for whatever reasons, a liberalized economy. With that we need to also accept the philosophy that we are committed to industrial growth. The question we now face is what kind of India should we have in mind if we allow industrial growth, though under a watchful eye? If the world comes knocking at our doors seeking our specific advantages, we should allow a pervasive mood of help to industry, particularly the Indian industry, in keeping the doors of information open. An open door policy to information will help and even ensure fair legislation and regulation.

There are several less measurable but not less important benefits by adopting an open information policy. Public data bases are public property. Indian industry needs to bank on Indian scientists to help them formulate policies and evaluate risks by evaluating the data. The expansion towards newer industries and the threat of increasing legislation makes this one of the most important activities that help industry–university interactions. In other words, certain classes of academicians, particularly those with strong interdisciplinary capabilities have a ready market for their work in Indian industry. This interaction can be developed to a substantive degree. After all services form a major chunk of the total global financial turnover! In order that industry fosters academic work of relevance to them, they would need access to data bases in the public domain to study, to diagnose and to formulate problems and developments. As of now, such data bases are the private property of individuals in public institutions! If this requires legislation, which it does, it is time that we do so. One cannot fight phantoms. In the absence of shared data, it would not be trial by jury but more like hanging by Lynch law!

As a nation, we do not have the culture of sharing information, excessive secretiveness being the rule than the exception. Information does not simply mean a few assorted tables and figures. By the time these are prepared, the data are already fully assimilated into a limited set of conclusions. On the other hand, by information, we refer to the primary data bases, collected on a general large design that permits, based on the keys provided of the contents of the data base, a number of questions depending on the evolving

insights of the analyst. In the West, universities are often the playing fields for data analyses in particle physics or astronomy, which we hope, will begin to happen also in this country. The awareness of information and its potential largely remains a secret from the student body in this country because data are not made routinely available. This forms a pathetic aspect of privatization of public knowledge such that the teaching programmes in statistics, management, etc. for illustrative purposes often depend on either published Western examples, or cooked up data and situations. We were saddened to see principal component analysis being taught in major universities with data no more than a few random numbers. The occasional statistician who writes a book also has to depend upon such artificial or borrowed data to illustrate techniques. If our industry has to employ manpower trained from within the country, the inputs for that earlier training should be relevant to the jobs ahead.

We would like to briefly summarize the Fisher episode⁵ for the readers, which we hope illustrates yet another aspect of information sharing which is by no means unimportant.

The Fisher episode

In the early fifties, Doll and Hill⁶⁻⁸ in a series of papers published, in the prestigious *British Medical Journal (BMJ)*, their findings on association between smoking and lung cancer which were based on 709 lung cancer patients and 709 patients without lung cancer in 20 hospitals in London. The study was mainly statistical in nature. Subsequently, the *BMJ*⁹ in an editorial comment on 29 June 1957 raised much alarm about the 'hazards to health and life' due to smoking and advocated that these 'must be brought home to the public by all modern devices of publicity'. The editorial also raised doubts about the integrity of the scientists such as Fisher and Egerton, both FRS, who held the view that 'a prima facie case had been made but further investigations were necessary'. This was however a dispute among professionals at this stage.

Fisher¹⁰ in a letter to *BMJ* particularly objected to the *BMJ*'s suggestion about the use of 'modern devices of publicity' implying how only a few years ago such an use had resulted in a major catastrophe in Europe in general and Germany in

particular, with regard to the role of publicity in the rise and fall of Nazism. Fisher strongly advised against 'organized creation of states of frantic alarm'. For this stand and on his insistence on further investigations, some media and interest groups raised a hue and cry and made attempt to tarnish the scientific reputation of Fisher, converting what was an in-house professional dispute into public mud-slinging. It is small wonder that academicians would be ill-disposed to take up the cause of specific industries for the justified fear that they would be branded as lobbyists.

Scientists have a great social responsibility among themselves to ensure that the debates on socially relevant issues mature into focused public opinion transmitted to public channels as directly as possible to upstage lesser informed writers. This requires reciprocal exchange of valuable social, econometric and epidemiological data among scientists and with industry. Organized special groups could be dogmatic like fundamentalists. If they raise doubts about integrity of scientists who dare to point out scientific deficiencies in the argument in a secretive environment without open debate due to locking up of public data, this would force away a few able scientists who could otherwise contribute significantly to improve the understanding of the problem. The Fisher episode clearly points out the necessity of investigating basic scientific problems related to 'hazards to health and life' in a less frantic way than is generally done then and now. The question that Fisher raised in *BMJ* is perhaps more relevant today than in 1957. To cite Fisher again, 'Is not the matter serious enough to require serious treatment?'

To summarize, 1. Highly regulated sectors by and large show poor profitability and have a large failure rate; 2. Regulation tends to be unpredictable both in terms of content and implementation, at the mercy of well intentioned but not equally informed, non professional pressure groups and prone to become the object of pork-barrel (*vic*) politics and political horse trading (*sic*)²; 3. While, in an increasingly technological world, a legitimate, regulatory machinery is highly desirable, this must be based on objective criteria and a statistical assessment of the risks involved. In a market economy, the right to public information, i.e. census, epidemiology, econometric and many other

related topics, ensures the right to compete in the open market: 4. The coming decade will see a host of industries currently free from the yoke of regulation dragged into the regulated sector. It is in the general interest to generate a credible and objective set of mechanisms/agencies capable of such risk assessments acceptable to international agencies, government and even in the public psyche.

1. Spalding, B. J., *BioTechnology*, 1993, 11,

1216-1217

- 2 McCormick, D. K., *BioTechnology*, 1993, 11, 693
- 3 Crawley, M. J., Hails, R. S., Rees, M., Kohn, D. and Buxton, J., *Nature*, 1992, 363, 620-623.
- 4 Hodgson, J., *BioTechnology*, 1992, 10, 1421-1426.
- 5 Cook, R. D., in *Lecture Notes in Statistics No. 1*, Springer Verlag, Berlin, 1980, pp 182-191
6. Doll, R. and Hill, B., *Br Med J.*, 1950, 2, 739-748.
7. Doll, R. and Hill, B., *Br Med. J.*, 1952,

2, 1272-1286

- 8 Doll, R. and Hill, B., *Br Med. J.*, 1956, 2, 1071-1081.
- 9 Editorial, *Br Med J.*, 1957, 1, 1518-1520
- 10 Fisher, R. A., *Br Med. J.*, 1957, 2, 43

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