



Asia Unplugged: The Wireless and Mobile Media Boom in the Asia Pacific. Madanmohan Rao and Lunita Mendoza (eds). Response Books, A Division of Sage Publications Pvt Ltd, B-42 Panchsheel Enclave, New Delhi 110 017. 2004. 464 pp. Price: Rs 850.

This 'study of wireless ecosystems and regional communication discourse of Asia-Pacific' is not a book on technology. It is about the direct and indirect impact of the growth of wireless/mobile in the region. Nearly 36% of mobile phones of the world were in Asia in 2002, and the figure is likely to cross 50% by 2007. Seven of the ten most profitable wireless operators today are from Asia. Asia is indeed 'at the cutting edge of wireless information society'. The book under review documents the rapidly expanding and changing mobile/wireless Asian market by bringing together 21 experts from the Asia-Pacific region to look at different aspects of the subject (T. C. A. Srinivas Raghavan, in a review of the book pointed out that this 'very speed is an enemy of a book like this', as it is likely to be outdated rapidly).

But the book does not confine itself to report this growth – in fact, it spends little space on that. Instead, it focuses on the evolving services and markets and how it impacts different sections/segments of economies and businesses. As the voice revenues for operators decline (several country-studies documented in the book show the general trend that the voice revenue declines as the market expands), they need to try to enhance their revenue using data services and the Internet. In fact, it is said that mobile phones will become mobile companions when they leverage the full power of the Internet. Therefore, while there are chapters that document success of *i-mode* services of DoCoMo in Japan, there are others which point to the limitations of mobile devices, primarily due to inadequacy of user interfaces (An excellent set of reviews of various books,

presented in the last section, examines this in greater depth). Then there are chapters on mobile gaming, mobile payments, mobile commerce and the impact that mobile/wireless technologies is likely to have on transport and supply-chain businesses. The impact of mobile and wireless services on news and entertainment industry is briefly discussed and the potential of the technology to bring together community groups, which could trigger popular movements is documented using Philippines as a case in point.

The book has an excellent chapter on location-based services, discussing technology as well as its implications for businesses and new services. Expanding the scope of the book from existing mobile systems to wireless Internet in rural areas and use of Wifi in local networks, the book touches upon their potential to transform governance and education. A section of the book looks at the regulations and their impact on growth of wireless and mobile services. The book is unique as it even looks at the growth of venture capital available for wireless area in the Asia-Pacific region.

The breadth of the book is to some extent its limitation. The book lacks depth in any of the areas, even in documenting the growth of the wireless industry adequately. A specific area which is only cursorily dealt with is the growth of wireless in rural areas of the region. It does not adequately address the issue of how connectivity, while growing rapidly, leaves out a significant section of the people and what is being done to overcome this situation.

Similarly, while the book does mention the relationship between telecom operators and technology equipment providers, it does not even deal with policy issues surrounding technology development. As Asian countries are recognized as leading markets in the world, will they not like to take a lead in technology development and own IPR and technology rights? Korea and Japan have focused on it for long. China, with its recent support to home-grown next-generation wireless technology, TD-SCDMA, is moving in this direction. India has set up a 'Center of Excellence in Wireless Technology' at Chennai to be amongst the leaders in wireless technology. A lot is happening in this area and a discussion on it could have been of significant value to the book.

Notwithstanding these limitations, the book is of great reference value and collects together a huge amount of data. For practitioners and students, it would be a book,

which could give a quick overview and information about what is happening in different countries in the region.

ASHOK JHUNJHUNWALA

*Indian Institute of Technology – Madras,
Chennai 600 036, India
e-mail: ashok@tenet.res.in*

Applied Statistics in Toxicology and Pharmacology. Katsumi Kobatashi and K. Sadasivan Pillai, Science Publishers, Inc, Enfield Distribution Co, P.O. Box 699, 234 May Street, Enfield, NH03748, USA. 2003. 111 pp. Price not mentioned.

Some observers consider 1 January 2005 as a watershed for the pharma industry in India. On this day, the patent regime changed. The earlier system of process patents was replaced by a system of product patents. In the old system you could take a proven drug and come up with a new process for producing it by some reverse engineering. This enabled a pharma company to skip a crucial phase in research and development, namely search for potentially useful molecules. Multinational pharmaceutical companies felt so threatened that many drugs were withheld from the Indian market. The new law eliminates this threat. One opinion is that the Indian government has gone overboard and has given in to the interests of MNCs more than was necessary.

Why were Indian pharma companies reluctant to launch their own searches for new drug molecules? This was not for want to ingenuity. According to one estimate, the process of starting from a class of potentially useful molecules and finally reaching the stage of market approval, took about a decade and about US\$ 800 million. This was beyond the means of most companies. Now there is no choice.

Another change in the drug research scenario in India is due to the trend of outsourcing. Recently, MNCs have started building their own offshore R&D divisions in India. In addition, there is considerable interest in outsourcing work to subcontractors who can cut costs and time. Such a practice existed even within the US and Western Europe, because of the savings involved. The device used was the so-called CRO, a clinical research organization. These

companies have started launching operations in India with encouragement from MNCs. Also, new CROs are coming up. This activity is expected to explode in the years to come.

A third apparent trend is the interest in bringing ayurvedic and other indigenous treatments of diseases into the modern sector. This again involves clinical trials of herbal medicines or practices like yoga or naturopathy.

For these reasons, the field of clinical trials is buzzing with activity in India. What is the role of statistics in this field? It is twofold. First, clinical trials have to be planned according to the principles of statistical 'design of experiments'. As an example, randomization is one such principle. It has become central enough for clinical trials to be called RCTs (randomized clinical trials). Just as there are good laboratory practices and good accounting practices, one can talk about good statistical practices. Such practices should be adopted for their intrinsic value. However, the matter acquires greater importance when regulatory authorities make them mandatory. In drug research worldwide, there are three regulators of great importance (since they control large markets). They are the US FDA and its counterparts in Western Europe and Japan. All these regulators have stringent requirements regarding statistics. Now they have a combined document about regulations (International Conference on Harmonization; Draft Guideline on Statistical Principles for Clinical Trials, Center for Drug Development Science, Georgetown University Medical Center, Washington, DC).

In addition to statistically valid design, the requirements include appropriate statistical analysis using well-established packages of computer software.

India has a glorious history in the discipline of statistics, with world-class Indian statisticians. In fact, decades before Indian IT personnel started making waves by rendering quality services on client sites at competitive rates, Indian statisticians had become standard fixtures in many international centres of agricultural research. It is no surprise therefore that multinationals like Pfizer and Novartis have set up statistical analysis groups in Mumbai and clinical trials done at centres worldwide are analysed there. Clearly, people in pharma research will have to adopt modern statistical practices in their work to be able to get approvals by overseas regulatory authorities. However, an anomalous

situation exists where biologists, chemists and medical researchers in India are not knowledgeable about statistics. This is partly due to the dichotomy between mathematical sciences (mathematics, physics and statistics) and biosciences (zoology, botany, biochemistry, medicine) in our educational system. Partly, the reason is also the lack of need to know. The only field of biology which emphasized good statistical practice in post-independence India, is agriculture. So you find that agricultural universities have thriving Departments of Statistics and graduate students learn statistics and practise it. Contrast this with the most famous of all CSIR laboratories, namely NCL, Pune. No statistics group was ever set up there.

It is our perception that there is an urgent need to fill this crucial gap in Indian scientific research infrastructure. Teaching of statistical aspects has to be organized at various levels and a sustained interaction has to be developed between researchers and statisticians. The latter will also have to take a proactive attitude and come out of their shells to participate in what may be one of the most exciting adventures for the country.

It is against this backdrop that we have to see the relevance of the book under review. The book is concerned with the topic of toxicology, which includes safety screening of potential drugs. The authors of this book wish to assist toxicologists in statistical matters, which are 'a hard nut to crack'. Toxic effects of a drug are examined in preclinical animal experiments and initial phases of clinical trials. The main objectives can be any one or more of the following: (i) deciding maximum tolerated dose (MTD), deciding minimum effective dose (MED) and examining pharmacodynamics of the drug.

The experiments typically involve either two or more drugs (often one of them control), or two or more doses of the same drug. Comparison of responses to these treatments needs specific statistical techniques. Which tool is to be used in a given situation needs knowledge about strengths and weaknesses of different tools.

I was hoping that the book would satisfy such a need. After reading the book, the reaction is mixed. Negative aspects outweigh positive ones. Let me first discuss the positive side. The book discusses situations commonly occurring in pharmacological/toxicological studies and statistical tools appropriate in that situation. Sometimes the discussion starts by de-

scribing a tool and then points out possible limitations and pitfalls thereof. Sections 1–6 discuss basic concepts like standard deviation and standard error, outlier, null hypothesis, significance level, etc. Sections 8 and 9 on *t*-test are also good. Sections 10–18 are on useful multiple comparisons. There are also sections on non-parametric tests. Dose response model is discussed in the last section (section 43).

There is some material on case studies, sections 28–30 and 32 are of this type. Sections 40–42 provide useful tips to choose appropriate statistical techniques.

In spite of some positive features, I have a lot of reservations about the book.

First, the presentation is bad. The book contains 111 pages. If space had been properly used, it would not have been more than 70 pages. The book is divided in 43 sections, appearing like 43 'chapters' of a book. The smallest section is of 6 lines and largest of 5 pages. Titles run anywhere between 1 to 11 lines. These being presented as chapters, each one starts on a fresh right page. This has resulted in 19 left hand side pages being blank. Did the authors desperately want the page number to cross 100?

Secondly, authors follow no fixed format. One possible format could be describing a technique followed by illustration and discussion about limitations. Or another possibility is describing a case study to motivate use of a particular technique and then giving relevant details. There can be more possibilities. The present book does not follow any such pattern. Apart from aesthetics such discipline makes a book more user-friendly. It is not clear what the authors have gained by abandoning such discipline.

Lastly, there are substantive errors. Following are examples of such errors. Power of a test is associated with alternative hypothesis. Farther you go away from null hypothesis (say of equality of two treatments), greater is the power. In other words, chance of detecting the difference between two treatments is better. In the present book, in many sections a group of tests is applied and power is declared to be high if its *p*-value is low. Thus, section 19 discussed 4 tests for homoscedasticity and tests are ranked for power according to *p*-value. One begins to wonder if authors are clear about the concept of power of a test.

The chapter on correlation gives a table for value of *r* and strength of correlation. The comment says, 'However, when $r > 0.6$

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or $r < -0.6$, they are statistically judged to have a significant correlation'. The statistical significance of correlation depends on the number of observations and there is no reference to this. So technically the statement is wrong.

There are other anomalies too. The authors repeatedly refer to papers in Japanese, which are unlikely to be accessible to readers. Another anomaly is the frequent absence of formulae. If the material is for users of statistics, this lapse can be fatal.

Amazon.com quotes a price of US\$ 45.00. For a person or library with limited funds, it may be better to skip this one.

SHARAYU PARANJPE

*Department of Statistics,
University of Pune,
Pune 411 007, India
e-mail: saparanj@stats.unipune.ernet.in*

Materials Research: Current Scenario and Future Projections. R. Chidambaram and S. Banerjee. Allied Publishers Pvt Ltd, New Delhi. 2003. 679 pp. Price not mentioned.

The last few decades of the twentieth century have witnessed a revolution in the development of tailored materials, with a profound impact on advances in technology development in nuclear energy, space, aeronautics, defence, electronics, photonics and information technology. In each of these sectors, progress has been possible due to the development of new materials.

It is well established that the availability of suitable materials is the fundamental requisite for the development of the advanced technologies. The book under review consists of 31 review articles contributed by authors representing a large number of academic and research institutions in India, and covers a wide range of materials, including liquid crystals, aerogels, superalloys, shape memory alloys, refractory metals, rare earths, metal matrix composites, compound semiconductors, ceramics and carbon-based materials. Most of the articles address the basic principles behind the relevant phenomena, different aspects of materials processing and characterization and the applications of these

specialized materials. The purpose of this book is to bring out the developments that have taken place over the last few decades in the domain of materials science, processing and related technologies in India against the background of the current global scenario and provide directions for future research.

The article entitled 'Materials research and technology foresight' by R. Chidambaram addresses the current trends in materials research with special emphasis on technology foresight. Chidambaram has clearly defined the role of basic and applied research in development priorities of the country. In his opinion, basic research should be globally competitive, while applied research and technology should relate to the demands of national development and security of a country. Chidambaram has categorized the current trends in materials research as miniaturization, mimicking nature, processing in conditions far from equilibrium, and predicting and tailoring structure and properties of materials by computational techniques.

In space missions, materials have to withstand severe and diverse environmental conditions with respect to temperature, pressure, shock, vibration, acoustic noise, etc. These complex technological demands have led to development of a variety of high quality materials and processing technologies by Indian Space Research Organization to sustain indigenous satellite launch programmes. In their paper, M. C. Mittal, Suseelan Nair, T. G. K. Murthy and S. Satish have described details pertaining to indigenous development of a large number of diverse structural metallic materials, composite materials and special functional materials. The various technologies established include (i) fabrication of rocket motor cases from maraging steels, (ii) electro slag refining of low alloy steels, (iii) investment casting of highly intricate cryogenic engine components of austenitic-ferritic-type cast stainless steel, and (iv) investment casting of superalloys for cryogenic engines. The authors provide details on advanced materials and processes, which are under development for the next generation of Indian space launch vehicles and spacecrafts.

Crystal engineering is recognized today as an important form of supramolecular synthesis and involves understanding of the properties of various intermolecular interactions of different nature, strength and directionalities. The most commercially significant aspect of crystal engineering

lies in the study of polymorphic substances used in pharmaceutical industry. G. R. Desiraju discusses the methodologies and strategies involved in crystal engineering.

Aerogels are highly transparent monolithics with porosities as high as up to 99.8%. Aerogels find applications as gas and liquid filters, containers for liquid rocket propellants, absorbers of harmful gaseous effluents, and for confinement of toxic nuclear waste. The steps and procedures employed in preparation of silica aerogels and their properties are discussed by A. Venkateswara Rao.

Shape anisotropy of the constituent molecules is a fundamental requirement for any substance to exhibit liquid crystalline phases or mesophases. The paper by R. Amaranatha Reddy and B. K. Sadasiva contains experimental results pertaining to the relationship between molecular structure and occurrences of banana-shaped compounds, i.e. esters derived from resorcinol and containing five rings.

In the article 'Nuclear reactor fuels and fuel cycles', C. Ganguly mentions briefly about the various reactor systems operating in the world and reviews the intricacies involved in the fabrication of different types of nuclear fuels for research reactors and power reactors. Current scenario with respect to use of metallic fuels, natural uranium, low enriched uranium, uranium-plutonium fuel, mixed uranium-plutonium oxide fuels, mixed uranium-plutonium carbide fuels and U-Pu-Zr metallic fuel is discussed, with special reference to their deployment in pressurized heavy water reactor, light water reactor and liquid metal-cooled fast breeder reactors. The fuel cycle options adopted by different countries, such as open 'once-through' cycle using LEU fuels, closed U²³⁸-Pu²³⁹ cycle, closed and combined U²³⁸-Pu²³⁹ and Th²³²-U²³³ fuel cycles, proliferation-resistant fuels and fuel cycles are highlighted.

Surfactants are amphiphilic molecules in which there exist a polar and a lipophilic segment. Thermodynamically driven aggregates of surfactant molecules, including those of natural origin (known as lipids) constitute some of the widespread organizations in biological systems. Molecular recognition and self-assembly play a crucial role in living systems such as RNA, DNA and biomembranes. Current trends in the synthesis of various surfactants mentioned above are described by Jayanta Halder and Santanu Bhattacharya on 'The molecular design of surfactant-based materials'.