

# E-COMMERCE STRATEGY FOR MAKING SME PHARMA SECTOR GLOBALLY COMPETITIVE

*devendra chaudhry*

## 1. Definition

**Ecommerce (e-commerce)** or **electronic commerce**, is the purchasing, selling, and exchanging of goods and services over computer networks (such as the Internet) through which transactions or terms of sale are performed electronically. Contrary to popular belief, ecommerce is not just on the Web. In fact, ecommerce was alive and well in business to business transactions before the Web back in the 70s via EDI (Electronic Data Interchange) through VANs (Value-Added Networks).<sup>1</sup>

Over the years as a result of fast paced demand driven technological developments, a wide variety of commerce has developed. Thus some of the well known technologies are:

- electronic funds transfer;
- supply chain management;
- Internet marketing;
- online transaction processing;
- electronic data interchange (EDI);
- inventory management systems; and
- automated data collection systems.

## 2. Types of E-Commerce

While, modern electronic commerce involves use of the World Wide Web at least at some point in the transaction's lifecycle, a large percentage of electronic commerce is conducted entirely electronically for virtual items such as access to premium content on a website, but most electronic commerce involves the transportation of physical items in some way. Online retailers are sometimes known as **e-tailers** and online retail is sometimes known as **e-tail**.

Accordingly, Ecommerce can be broken into four main categories: B2B, B2C, C2B, and C2C which are in essence various segments along the ecommerce value chain spectrum.

### **2.1 B2B: Business to Business**

---

<sup>1</sup> Wikipedia

In this segment, companies conduct business with each other such as manufacturers selling to distributors and wholesalers selling to retailers. Pricing is based on quantity of order and is often negotiable.

## **2.2 B2C Business to Consumer**

Here, businesses selling to the general public typically through catalogs utilizing shopping cart software. In value terms B2B is more than B2C which is very specific in terms of individual transaction size and specification in lesser time intervals. A variation of this is a situation wherein, companies using internal networks to offer their employees products and services online not necessarily online on the Web but through an Intranet. This is B2E (Business-to-Employee) ecommerce.

## **2.3 C2B Consumer to Business**

In this case, a consumer posts his project with a set budget online and within hours companies review the consumer's requirements and bid on the project. The consumer reviews the bids and selects the company that will complete the project. E-commerce empowers consumers around the world by providing the meeting ground and platform for such transactions.

## **2.4 C2C Consumer to Consumer**

Here, websites offer free classifieds, auctions, and forums where individuals can buy and sell thanks to online payment systems like PayPal where people can send and receive money online with ease. eBay's auction service is an example of where person-to-person transactions take place everyday since 1995.

## **2.5 Government to Employee/Citizen**

This comprises G2G (Government-to-Government), G2E (Government-to-Employee), G2B (Government-to-Business), B2G (Business-to-Government), G2C (Government-to-Citizen), C2G (Citizen-to-Government) are other forms of ecommerce that involve transactions with the government--from procurement to filing taxes to business registrations to renewing licenses.

## **3. E-Commerce in Pharmaceutical Industry<sup>2</sup>**

---

<sup>2</sup> Rama Prasad Kanungo, in E-Commerce in the Pharmaceutical Industry: Threshold of Innovation , Research Co-ordinator AAFBRU, Cardiff Business School

Commonly the pharmaceutical industry is perceived as a research intensive industry on one hand and a prescription driven and dependent retail medicine business on the other.

A study by Betz (1987)<sup>3</sup> emphasizes that the pharmaceutical industry is more driven to gain competitive advantage through innovative technology. Bullocks as early as 1996 predicted that the percentage of total online revenue generated from 'for-fee' pharmaceutical sites will grow from near zero in 1995 to almost 30% by the end of year 2000, generating revenue of over \$3.5 billion. In actuality it reached 10.2 Bn. It is now forecasted that almost 70% of operational economy will be generated by E-commerce by the end of year 2015.<sup>4</sup>

#### **4. Strategic Importance of E-commerce in the Pharmaceutical Industry**

Deployment of ecommerce in the pharmaceutical industry centres around significant gains in business transactions by utilising E-commerce to circulate information in order to build an integrated network for both the industry and the users by shrinking the geographical distances and make timely access to medical information and latest biotech knowledge thereby providing better services to the users and to the pharmaceutical community as a whole.

Five key types of activities have seen the development of ecommerce in the pharma sector through web based portals:

- Focused information
- Corporate identity sites - profile different pharmaceutical companies and provide necessary medical information.
- Gateway sites – [www.catesource.com](http://www.catesource.com). Such sites are centralised points of entry into diverse resources of information on the internet by creation of a common channel for exchange of commercial and non-commercial information.
- Store fronts and Strip mall – [www.validate.com](http://www.validate.com) . such sites focus on information that is directly useful to the people in the pharmaceutical professions. They focus on the user and retailer relationship. For instance, Pharma Indonet is a high traffic web where drug information designed for health, the professionals, and consumers can be found.

---

<sup>3</sup> Frieden, Jonathan D.; Roche, Sean Patrick (2006-12-19), "E-Commerce: Legal Issues of the Online Retailer in Virginia" (PDF), *Richmond Journal of Law & Technology* 13 (2), <http://law.richmond.edu/jolt/v13i2/article5.pdf>

<sup>4</sup> Graham, Mark (2008), "Warped Geographies of Development: The Internet and Theories of Economic Development" (PDF), *Geography Compass* 2 (3), <http://geospace.co.uk/files/compass.pdf>

The above classification can also be typified as E-marketing, E-operation, E-selling and E-clinical electronic transactions. Needless to add that the pharmaceutical industry expands its presence by online campaigns providing relevant information aimed at a specific target audience, attracts new investors enhancing mutual relationship, shares company news with the peer groups and the users. Appropriate positioning of the company and its products in cyberspace enables companies to reach wider market and increase their band-width. Though this has certain limitations such as, uncertainty of the users about the validity and authenticity of products and information but rightful approaches such as, openness to contact and discussion, on-line advice by registered professionals often minimise such problems.

Studies reveal that here are four essential factors that derive real value for the pharmaceutical industry through E-commerce<sup>5</sup>:

- First, enable a compelling business process – this allows access to global information, creates significant new revenue and formulates new business models for the industry.
- Second, tap into technological mega-developments – this expands bandwidth improving technology and its implementation, synthesises the vast amount of information contents.
- Third, favourable regulatory evolution – this monitors and provides guidelines for electronic submission, prepares regulations and preserves intellectual property.
- Fourth, growing user involvement – this helps to identify consumer action groups, disease information sources, physicians' intermediation. The pharmaceutical industry strategically uses real value to get access to new target audience through product and process development.

Accordingly, over the years the pharmaceutical industry has managed to gain sustainable advantage through E-commerce in comparison to other industry sectors. The organizations:

- regularly update and revise their web pages following quality control mechanism such as Continuous Quality Improvement (CQI) procedure
- providing current and relevant information
- provide training materials
- enable submission forms for regulatory purposes
- provide on-line patient satisfaction surveys
- deliver patient-specific information

---

<sup>5</sup> Kessler, M. (2003). More shoppers proceed to checkout online. Retrieved January 13, 2004

and so on and so forth. The pharmaceutical industry provides significant support to the users by advising and securing access to individual prescription history, also receives considerable back-up by releasing reliable general medical information such as new drug formulation, clinical breakthrough and availability of further support. This helps them to attract new users and increase their retail base. Also, this allows them to maintain constant communication with doctors/pharmacists and interact with the users so that they can provide electronic prescriptions and carry on subsequent follow-ups. Therefore, the strategic importance of E-commerce in the pharmaceutical industry is indeed significant.

## **5. Issues of E-commerce in the Pharmaceutical Industry**

### **5.1 Security and Privacy:**

The use of E-commerce, following standardized guidelines establishes a better working relationship between different partners, suppliers and the users. The uniform practice of such standards brings wholesalers, manufacturers, group purchasing organisations, drug chains and claim processors together. However, to maintain and foster such practices security and privacy are paramount. Security and privacy are two major concerns in E-commerce, which need effective protection otherwise users trust and professional ethics would be at jeopardy, or else violated. The personal database of patients and professional classification of practitioners would be at risk if monitoring and controlling would not be prioritised. E-commerce follows the internet protocol and the guidelines for browsers, web servers which exist beyond the corporate security fire wall. Hence on the issue of privacy and security, it should be taken with caution that patients visiting virtual doctors on webs need to be aware of the implication and information they are sharing with the others, which might have some repercussion on them.

Not only patients but suppliers, research groups and non-clinical professionals may face detrimental consequences without proper privacy and security. So, protective measures should be enforced in order to retain privacy and security of all the users as well as professionals. In e-transaction, Secure Socket Layer (SSL) is a protocol that secures connections to server protecting the information from stray use. Secure Electronic Transactions (SET) is another protocol for browsers and credit card control (source-NASSCOM).

### **5.2 Legal issues**

The major legal issues surround fixing of liabilities relating to security, authentication, liability through regulation of on-line sales and Rx drugs; privacy, encryption of on-line therapies and electronic contracting between the partners. For security measures government regulations with statutory effect should be implemented on the practices of the pharmaceutical industry.

Equally, the authentication of practitioners' identity and validity of web information can be regulated by the respective government in its sovereign. For e-contracts government rules should be reinforced with strict legislations to restrain spurious information and practitioners. Proper protection of the users from false or misleading commercials and regulation on advertising of OTC drugs, dietary supplementary, health care services, medical devices, Rx drugs and prescriptive practices can provide a better and healthy service to them and other medical professionals. Equally, the medical professionals need to adhere to the framework set by suitable and authenticated authority, so that proper on-line advice and support can be offered to the users.

## **6. Supply Chain Management and E-commerce**

Supply chain management is a crucial aspect of all the industry sectors today. Like any other industry therefore, the pharmaceutical industry is very much dependent on logistic and supply chain management to reach out to their retailers and the users. Integration and incorporation of information and data, personalised to a user or groups of users allow a customised response by creating a type of logistic relationship. The opportunity to appropriate the benefit of E-commerce lies in developing the rightful sharing of information, data and process between different trading partners. The partners and supplier set realistic expectations to achieve their goals by mutually contributing to resources and capabilities.

Various frameworks have therefore been developed to tap these opportunities:

- Supply Chain Management (SCM)
- MRP (Material Resource Planning)
- MRP II (Manufacturing Resources Planning)
- CIM (Computer Integrated Manufacturing), and
- ERP (Enterprise Resource Planning).

In the B2B space, the pharmaceutical industry obtains business analysis, design, development, implementation and maintenance of their products and services. Subsequently, these products and services contribute effectively to our lifecycle and lifestyle. It is reported that the e-contract sales have increased from 50% to 80% in the pharmaceutical industry which owes a great deal to lifecycle portfolio management (Source: PhRMA Annual Survey, 2007). This is perceived as user oriented and value adding for both the users and the industry. Usually different electronic formats are extensively available for the e-contracting. The e-contracting is classified into two types: first, contract between the pharmaceutical companies and their buyers; second, contract between the pharmaceutical companies and the users. Such contracts promote e-marketing by the means of interactive media and channels.

## **7. Strategy for Indian SME Pharma industry**

### **7.1 Indian Pharma Market nature**

The Indian pharmaceutical business, is now a seventeen billion USD (over sixty eight thousand Crore rupees) Industry.

It has shown tremendous progress in terms of infrastructure development, technology base creation and a wide range of products. It has established its presence and determination to flourish in the changing environment. The industry now produces bulk drugs belonging to all major therapeutic groups requiring complicated manufacturing technologies. Formulations in various dosage forms are being produced in GMP compliant facilities. Strong scientific and technical manpower and pioneering work done in process development have made these possible. The country now ranks 4th worldwide accounting for 8% of world's production by volume and 1.5% by value. It ranks 17th in terms of export value of bulk actives and dosage forms. Indian exports are destined to more than 200 countries around the globe including highly regulated markets of US, Europe, Japan and Australia.<sup>6</sup>

A highly fragmented industry, the Indian pharmaceutical industry is estimated to have over 10,000 manufacturing units, as estimated by the Organisation of Pharmaceutical Producers of India. The organized sector accounts for just 5%, of the industry, while a major 95% is in the unorganized sector. A large number of players in the unorganized segment are small and medium enterprises and this segment contributes 35% of the industry's turnover. SMEs are potentially a key engine of economic growth, job creation and greater economic prosperity.

A paradigm shift occurred in the Indian pharmaceutical industry with India becoming a signatory to the WTO order, ushering in the Product Patent Regime. With India becoming TRIPS compliant in Jan 05, the Indian market has become an attractive option for the introduction of research-based products. Indian companies are now exploring new business models such as contract research, for drug and discovery research & development, as well as contract manufacturing. The domestic bulk drug and formulation industry has been able to largely meet the domestic demand for these products. Besides, it also exports to several regions, including the EU and US, and exports currently constitute nearly 48% of the industry's turnover. Moreover, trends such as favorable regulatory environment, increased expenditure on R&D and improved technical skills in the field of chemical synthesis have aided the growth prospects. The increasing alliances and tie-ups of Indian companies with global players have further given a boost to Indian exports.

India will have a key role to play in this transforming scenario, with the small and medium enterprises expected to chalk out a defining role for themselves. Despite

---

<sup>6</sup> <http://chemicals.nic.in/pharma1.htm> (Accessed on January 19, 2009)

the lag in R&D investments in India, small and medium players seem well poised to take on global challenge, especially in the bulk drugs space.

Several new opportunities have opened up for the SME sector. An emerging trend among these enterprises has been their involvement in clinical trials, either on their own or on contract basis. CRAMs opportunities are also accruing to small and medium players who have got expertise and facilities approved by regulatory agencies. New product launches, although mainly done by large players, helps the SMEs to acquire contracts for manufacturing and opportunities to supply APIs and related chemicals. Moreover, a marketing approval of generic products gives them the opportunity to increase their product portfolio.

## **7.2 Need for the Technology Intervention (Why?)**

Outsourcing opportunities, though immense, are however being acquired by mainly players with better economies of scale and constant quality delivery. Growing competition has compelled huge capital investments in fixed assets and technology, which the SMEs are finding difficult to sustain.

Some of the key challenges faced by SMEs include achieving stricter quality norms, consistent technical upgradation and marketing. Most of SME sector manufacture on contract for larger brand driven industry leaders or take an independent route for low technology medicines for the rural and semi-urban market driven by the government's health care system. Thus most of the small and medium enterprises in the pharmaceutical segment operate in the local market, and mainly manufacture formulations. To a great extent, survival of these units would depend on how well and quickly these companies are able to adapt to the changing business scenario.<sup>7</sup>

The relationship of contract manufacturing along with the business value to do independent higher profit oriented manufacture predicates appropriate technological support through a dedicated electronic platform for the SMEs. This is easily said than done specially given the technological and surplus profit capacity of the SMEs to invest in technology heavy activities. It is this Unique Business Proposition (UBP) which needs to be developed to leverage the SME growth into higher orbits of export led growth given the high share of the Indian generics in the world market.

## **7.3 Objectives of the Project (What?)**

Following are the broad objectives of the project envisaged targeting the SME sector of the Indian Pharmaceuticals industry such that these organizations are able to evolve faster and move up the Value-grid of the industry.

---

<sup>7</sup> <http://www.dnb.co.in/Pharmaceutical/smes.asp> (Accessed on January 20, 2009)

- 7.3.1 Development of an e-commerce portal** to fulfill the needs of all the stakeholders. The portal should act as an e-market place that can address various types of transactions (viz. Business-to-Business (B2B), Business-to-Customer (B2C) and Government-to-Business (G2B)). Electronic forums can be created for providing an interface among the customers and spread awareness about various products. Given the fact that the SME players in the Pharmaceuticals industry are largely unorganized in nature, this initiative will help them reach out to markets, co-opt strengths of other SME players (which in turn will help them in executing projects more complex in nature), update them about various rules and regulations both for domestic as well as international markets, get larger business opportunities from India and abroad, make retailers and other retail & wholesale purchasers transact with these Pharmaceutical companies directly through this portal etc.
- 7.3.2 Government will act as the Trusted Third Party** for the portal which will give tremendous confidence to various stakeholders and customers of this sector. The whole exercise will boost both competition and cooptation in the industry with better and transparent opportunities equally available for all players leading to the growth (both organic and inorganic) in the SME Pharmaceuticals organizations. In addition to this, it will also lower the entry barriers of firms trying to start-up and/or enter the industry. It is also expected that this will also reduce the mobility barrier between various existing strategic groups.
- 7.3.3 Standardization of the Processes and Documents:** Currently there are no standardized process and documents for various tasks of the SME sector. All the process and documents need to be examined and a standardized process needs to be developed for various end uses in the manufacture to delivery chain.
- 7.3.4 Ease in the process of new product application for approval:** The existing process for approval of new product is quiet tedious and time consuming. The new initiative is expected to ease the process of new product application for approval by adopting electronic uniform formats and submission as well as approvals on the net.
- 7.3.5 Standardization** of the regulatory issues for online payment for Rx as well as B2B activities.
- 7.3.6 Providing a Platform for Online Exchange of Orders:** The platform would act as an online exchange, working as one stop point for bulk and generic drug supplies orders from other pharmaceuticals organizations for both domestic and international markets. The performance of the

exchange would have to be monitored by an independent agency acting as an **accreditation authority** for the same.

**7.3.7 Provide a single face for the pharmaceutical SME:** The platform would provide a single face for the pharmaceutical SMEs to the rest of the world, thus reducing the cost of seeking opportunities and transaction costs of these SME organizations for getting new opportunities.

## **8. Project Approach (How?)**

**8.1 *Obtain a Holistic View of the Challenges, Opportunities and Needs of the SME Pharmaceutical Organization:***

Various stakeholders of this sector need to be consulted to obtain a holistic view of the challenges, opportunities and needs of the pharmaceutical SMEs. The project should be industry driven with accountable stake of the industry in the establishment and operation of the ecommerce platform.

**8.2 *DoP role in providing an Electronic Platform:***

The project is envisaged to make the SME sector of the Pharmaceuticals industry thrive through an electronic platform being provided by the Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Government of India.

**8.3 *Encourage the Global Players to Post their Requirements in the Website:***

Global players trying to outsource Bulk and/or Generic drug manufacturing to India would be encouraged to post their requirements in the website. Based on the ratings provided by the accreditation agency running the exchange, the client may select a list of pharmaceutical firms for submitting requisite proposal (like EoI) else various SME firms may also decide to submit the requisite proposals for availing the business opportunity.

**8.4 *Single Point of Information Dissemination:***

The portal should act as a single point of information dissemination about various features (including prices) being offered by various Pharmaceutical firms of this sector. That will not only enable awareness of Doctors before prescribing different medicines, but will also help individual patients to know about the drugs being administered. Moreover, various channels of information delivery may be considered for enabling knowledge updating of the doctors.

**8.5 *Reduction of Entry Barrier for entering the Pharmaceutical Industry:***

The whole exercise will boost both competition and cooperation in the industry with better and transparent opportunities equally available for all players leading to the growth (both organic and inorganic) in the SME

Pharmaceuticals organizations. This will help lower the entry barriers of firms trying to start-up and/or enter the industry both for the domestic as well as the export market. It is also expected that this will also reduce the mobility barrier between various existing strategic groups.

- 8.6 *Provide Rating to All SME Pharmaceutical Organizations:*  
An accreditation agency will give rating to all SME pharmaceutical organizations based on their performance and customer (both business as well as individual) feedback. An efficient organization structure, strategy and requisite processes for this accreditation agency is also needed to be formulated.
- 8.7 *Selection of Consulting Agencies:*  
The selection of consulting agencies should be done following the Quality and Cost-Based Selection (QCBS) Method following the World Bank guidance, given the fact that a project of this nature would involve a lot of think-tank activities and innovation.
- 8.8 *Provide Enterprise Resource Planning (ERP) Solutions Through the Web Portal:*  
Due to the high cost of ERP packages, most of the SMEs are unable to implement and take the advantage of such packages. Providing the features of ERP through the portal will immensely help the cause of such organizations. This will be specially useful in building GMP compliance capacity of the SME sector and thus make them more globally relevant in terms of direct contract manufacture.
- 8.9 An enabler platform for networking between various pharmaceutical SME players to promote cooptation that would help these firms for inter- SMEs tie-ups, joint bidding of projects, merger and acquisitions, skills exchange, sharing of experiences and best practices, knowledge networking etc.
- 8.10 A single face for the pharmaceuticals SME organizations to the rest of the world, thus reducing the cost of seeking opportunities and transaction costs of these SME organizations for getting new opportunities etc.
- 8.11 Act as a platform for consolidation of supply side for the pharmaceuticals SMEs. This would mean a manufacturer of a particular chemical used by the pharmaceutical firms would get lot of credibility (with lower transaction cost) and visibility among potential customer organizations.
- 8.12 Act as a single point of information dissemination about various features (including prices) being offered by various Pharmaceutical firms of this sector. That will not only enable awareness of Doctors before prescribing different medicines, but will also help individual patients to know about the drugs being administered. Moreover, various channels of information

delivery may be considered for enabling knowledge updating of the doctors.

- 8.13 Given the presence of the accreditation authority, individual customers can also order medicines from the portal with the guarantee of the accreditation agency of purchasing a genuine drug. This consolidation exercise will also help the Central Drug stores, Government hospitals, Private hospitals, Chemists and Pharmacists to order a particular drug from a particular manufacturer very effectively. Moreover, given the transparency in price will also help them to choose as per their requirements. The whole exercise will boost both competition and cooptation in the industry with better and transparent opportunities equally available for all players leading to the growth (both organic and inorganic) in the SME Pharmaceuticals organizations. In addition to this, it will also lower the entry barriers of firms trying to start-up and/or enter the industry. It is also expected that this will also reduce the mobility barrier between various existing strategic groups.
- 8.14 A physical existence of the portal can also be thought of as a separate organization to market the Indian Pharmaceuticals SME sector in the domestic and international markets to increase awareness of this exercise, expedite awareness among various other stakeholders and accelerate usage of the portal and growth of the SME Pharmaceutical organizations.

-----

### **E-Commerce development Timeline**

- 1990: Tim Berners-Lee writes the first web browser, WorldWideWeb, using a NeXT computer.
- 1992: J.H. Snider and Terra Ziporyn publish Future Shop: How New Technologies Will Change the Way We Shop and What We Buy. St. Martin's Press. ISBN 0312063598.
- 1994: Netscape releases the Navigator browser in October under the code name Mozilla. Pizza Hut offers pizza ordering on its Web page. The first online bank opens. Attempts to offer flower delivery and magazine subscriptions online. Adult materials also becomes commercially available, as do cars and bikes. Netscape 1.0 is introduced in late 1994 SSL encryption that made transactions secure.
- 1995: Jeff Bezos launches Amazon.com and the first commercial-free 24 hour, internet-only radio stations, Radio HK and NetRadio start broadcasting. Dell and Cisco begin to aggressively use Internet for commercial transactions. eBay is founded by computer programmer Pierre Omidyar as AuctionWeb.
- 1998: Electronic postal stamps can be purchased and downloaded for printing from the Web.
- 1999: Business.com sold for US \$7.5 million to eCompanies, which was purchased in 1997 for US \$149,000. The peer-to-peer filesharing software Napster launches.
- 2000: The dot-com bust.
- 2002: eBay acquires PayPal for \$1.5 billion. Niche retail companies CSN Stores and NetShops are founded with the concept of selling products through several targeted domains, rather than a central portal.
- 2003: Amazon.com posts first yearly profit.
- 2007: Business.com acquired by R.H. Donnelley for \$345 million.
- 2008: US eCommerce and Online Retail sales projected to reach \$204 billion, an increase of 17 percent over 2007.

## References

- Chaudhury, Abijit; Jean-Pierre Kuilboer (2002). *e-Business and e-Commerce Infrastructure*. McGraw-Hill. ISBN 0-07-247875-6.
- Frieden, Jonathan D.; Roche, Sean Patrick (2006-12-19), "E-Commerce: Legal Issues of the Online Retailer in Virginia" (PDF), *Richmond Journal of Law & Technology* **13** (2), <http://law.richmond.edu/jolt/v13i2/article5.pdf>
- Graham, Mark (2008), "Warped Geographies of Development: The Internet and Theories of Economic Development" (PDF), *Geography Compass* **2** (3), <http://geospace.co.uk/files/compass.pdf>
- Kessler, M. (2003). More shoppers proceed to checkout online. Retrieved January 13, 2004
- Nissanoff, Daniel (2006). *FutureShop: How the New Auction Culture Will Revolutionize the Way We Buy, Sell and Get the Things We Really Want* (Hardcover ed.). The Penguin Press. pp. 246 pages. ISBN 1-59420-077-7.
- Seybold, Pat (2001). *Customers.com*. Crown Business Books (Random House). ISBN 0-609-60772-3.
- Miller, Roger (2002). *The Legal and E-Commerce Environment Today* (Hardcover ed.). Thomson Learning. pp. 741 pages. ISBN 0-324-06188-9.
- Betz, F. (1987) *Managing Technology*. Prentice Hall Inc.
- Bullock, W.O. (1996) *The Internet: A biotechnology business development tool*. On Target, Institute for Biotechnology Information, Research Triangle Park, NC, Sept./Oct. Conlon, M. (1999)
- "E-commerce and Management of Clinical Trials," University of Florida Health Service Centre. Presented in E-commerce Conference, November.
- Coombs, R. and Richards, A. (1991) "Technologies, products and firms' strategies," *Technology Analysis and Strategic Management*, March, Vol.3, Issue 1, pp.77-87.