The Upper-Echelons Effect on the ITC Development of the Andhra Pradesh State of India: A Historical Analysis

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Abstract

This article explores the evolution of the Andhra Pradesh (AP) state of India as Asia’s major ICT hub. Conceptualizing the functioning of a state as that of a corporation, we provide a historical narrative of the ICT development trajectory of AP, focusing mainly on the roles of top management team. We use the upper-echelons perspectives as the theoretical basis of the explanation. Six stages of the AP’s ICT development trajectory were identified— the planning phase; the socialism and nationalism phase; early spark phase, liberalization phase; preparatory phase and take-off phase. The measures taken by the central government seem more prominent in the first four phases whereas the state government played important roles in the last two phases.

Keywords: Historical methods, Andhra Pradesh, India, information and communications technologies, upper-echelons theory, socialism

INTRODUCTION

Can a large political entity acquire corporate-like characteristics and employ marketing methods to promote its “corporate image” that attracts some of the leading companies worldwide (Kotler, Jatusripitak and Maesincee 1997)? During the 1995-2004 period, the Andhra Pradesh (AP) state of India – under a charismatic Chief Minister who likened himself to a CEO – managed to achieve a major “marketing” coup, but with some interesting political fallout. This article explores the rapid evolution of AP as Asia’s major IT hub and a significant producer, consumer, and exporter of information and communication technology (ICT) products and services. Employing marketing, political, and organizational theories, we explore the processes that happened in AP during the focus period of 1995-2004, based on a historical background analysis going back to the late 1940s. Before commencing the analysis, a brief background of AP is useful to set the context.
Brief Background of AP as a Technology Hub

The Hi-tech city at Hyderabad, the capital of AP, has Asia’s largest software technology complex housing Microsoft’s development facility and the operations of industry giants like Infosys, Oracle, Dell, GE Capital, IBM, Motorola, Ericsson, Citicorp, Baan/Invensys and HSBC.

While software exports from India grew by 56% annually during 1996 to 2000\(^1\), AP was the only Indian state to have consistently triple digit growth rates during that period – a Compound Annual Growth Rate (CAGR) of 121% (IT People 2001). Software exports from AP increased from $1 million to over $600 million during 1992-2002 (Apinfrastructure.com 2001; Business Standard 2003). From only a handful of software units in 1992, there were 1500 units in Hyderabad and 68 outside by 2001 (IT People 2001). Total capital investment in software industry reached $450 million as of March 2001 ($256 million by foreign companies) (IT People 2001). With 7% of India’s population, AP accounts for 23% of software professionals in India (Ramachandraiah and Bawa 2000) and 39.1% of the Indian software professionals working in the United States (Andhratoday.com 2000; Prasanna 2001b). In 2002, the service centers of E-Seva, a government agency, provided 23 government-to-consumer (G2C) services and 5 business-to-consumer (B2C) services (Chowdary 2002).

Table 1, 2 and 3 here

Brief Conceptual Background and Structure of Paper

This paper explores the influence of values, beliefs and experiences of a state’s “top management team” on ICT development. Conceptualizing the functioning of a state as that of a
corporation (Kotler et al. 1997), the high-ranking members of a state’s government can be mapped to the “top management team” in a corporation. Given the “quasi-federation” Indian political structure, with the central government having exceptional powers (Joshi and Little 1994, p.13) while the state governments enjoy considerable independence in state-level policies (The Economist 2000), we examine policy dynamics at the central as well as the AP state government levels.

The central contribution of the current work to macromarketing research is to provide new insights on the influence of the top management team’s value, beliefs, skills and experiences on ICT development. Findings of this study are relevant to practitioners in influencing the organizational outcomes as well as to policy makers, especially those in developing countries, in devising strategies to accelerate ICT diffusion.

Given the uniqueness of AP’s ICT trajectory and our idiographic assumption, we consider historical methods as the most appropriate approach to study AP’s ICT development locus (Smith and Lux 1993; Mason et al. 1997). The remainder of the paper: a) discusses the theoretical underpinning of our analysis; b) examines the major phases of AP’s ICT development trajectory; and c) provides some conclusions.

THEORETICAL FRAMEWORK: THE UPPER-ECHELONS THEORY
The theoretical basis of this paper evolved over time in response to our deepening understanding gained through the collection of secondary and primary data and our changing ideas concerning appropriate theory. Since AP was conceptualized as “Andhra Pradesh, Inc.” with its Chief Minister as the CEO (Sidhva 1998), we analyzed its ICT locus from a corporative perspective. Theorists have presented the analogy between the functioning of a state and that of a corporation.
Vision, mission and strategies are critical to a nation’s economic development, like a company’s profitability (Kotler et al. 1997). We then examined the sources of vision, mission and strategies that influenced AP’s ICT trajectory.

**The Upper-echelons Effect on the AP ICT Trajectory**

We draw upon the upper-echelons theory (Hambrick and Mason 1984), which argues that upper-level managers significantly influence organizational outcomes because of the types of decisions they are empowered to make. A growing body of recent research (Romanelli and Tushman 1986; Finkelstein and Hambrick 1990; Smith et al. 1996) suggests that the top management team strongly influences an organization’s vision, strategies and outcomes. The theoretical underpinning of this stream of research is based on the concept of the *dominant coalition* proposed by Cyert and March (1963).

Prior literature has successfully applied the upper-echelons theory to link top management teams with organizational innovation (Bantel and Jackson 1989; O'Reilly and Flatt 1989), strategy (Finkelstein and Hambrick 1990; Michel and Hambrick 1992), strategic change (Grimm and Smith, 1991; Wiersema and Bantel, 1992), and performance (O'Reilly and Flatt 1989; Michel and Hambrick, 1992; Hambrick and D'Aveni 1992).

An understanding of personal experiences, skills and value systems of top managers thus can help us better understand organizational outcomes (Smith et al. 1994). Values and cognitive bases of “powerful actors” are important elements of the upper-echelons perspective, which, in part, are influenced by corporate culture (Kitchell and Mayer 1994). The sources of corporate culture are overtly stated organizational goals, missions and corporate commitments (Deal and Kennedy 1982), distinct leadership styles and company founders' values (Schein 1991).
Three alternative models exist on the mechanisms of top management influences on organizational outcomes. The demography model argues that team demography accounts entirely for performance and process has no impact. The CEO monitors team behaviors to restore team predictability (Holmstrom 1979; Simons et al. 1999). To overcome uncertainties and guard against opportunism, the CEO relies on formal rules, regulations and processes (Eisenhardt 1989; Smith et al. 1996). Theoretical (Pfeffer 1983, p. 323) and empirical evidence (Keck 1991; Michel and Hambrick 1992; Hambrick and D'Aveni 1992) suggests that team tenure influences performance.

The process model maintains that process contributes incrementally and directly to performance outcomes over and above the team's demography. Social psychology literature has identified social integration and communication as two key predictors of performance (Cartwright and Zander 1968; Shaw 1981; McGrath 1984). Social integration reflects "the attraction to the group, satisfaction with other members of the group, and social interaction among the group members" (O'Reilly and Flatt 1989, p. 22).

The Intervening model argues that team demography influences performance entirely through team processes without any direct effects on performance. Because of the difficulties in communication and diminished team integration, unfamiliar language of people with dissimilar experiences, backgrounds, beliefs, and values, team heterogeneity is negatively related to social integration and communication (Wiersema and Bantel 1992).

The characteristics of the top management team are tightly linked to relative explanatory powers of three alternative perspectives—functional, political and social—in ICT assimilation. The functional perspective argues that selection and implementation processes are influenced by
objectives such as the *costs, benefits and performance* (Franz and Robey 1984). Put differently, this perspective views IT adoption as a *business move* and not a *technology play* (Rifkin and Kurtzman 2002; p. 96). The essence of political perspective is that political rather than functional criteria influence IT implementation and outcomes (Franz and Robey 1984). The social perspective emphasizes that individuals’ perceptions and behavior are functions of those of other members of the social group (Rice and Aydin 1991).

**Upper-echelons Effects: Values, Beliefs, Experiences**

Before we proceed further, we discuss values, beliefs and experiences of the top management teams that influenced AP’s ICT trajectory. As mentioned earlier and presented in Figure 1, Indian federal government and the AP state government have influences of different nature on AP’s ICT landscape. At this point it must be emphasized that before the 1991 liberalization, virtually all the important decisions that affected ICT were centralized. The liberalization drastically strengthened the power of a state like AP.

*Figure 1 here*

The state and federal “CEOs” whose actions influenced AP’s ICT landscape differ widely on value, beliefs and experiences. For instance, Fabian socialism influenced Jawaharlal Nehru, the first Prime Minister of independent India and became a firm and convinced Marxist. Lal Bahadur Shastri, the Indian prime minister after Nehru, emphasized more on national stability than on economic growth. Indira Gandhi, the prime minister during 1966-1984, shifted institutional norms to distributive justice. Rajiv Gandhi, who became prime minister in 1984, possessed computer knowledge and attempted to use ICT to solve India's problems (Crook 1991).
Naidu, the AP ‘CEO’ during 1995-2004, differed from his predecessors and counterparts on value, belief, skills and experience. For instance, unlike predecessors, Naidu did not like to draw crowds or generate emotional appeal. As an example, he banned the traditional placing of garlands on him at celebrity events. He also avoided dinners and parties that discussed politics. Thakur (2001) contrasts Naidu with Bihar’s (Indian states) former chief minister Laloo Yadav:

Naidu is everything that Yadav is not. Naidu uses a laptop and has successfully lured investors such as Microsoft and GE Capital, while Yadav rails against the Internet and demands that Delhi pour more money into Bihar’s loss making state-owned enterprises (QF Dhume 2002).

He took decisions that went against the value system of Indian politicians. To take one example, in February 1999, AP government decided that Indian Institute of Information Technology (IIIT) would not provide reservations for the Backward and Scheduled classes and would strictly adhere to the admissions based on merit.

Naidu gave publicity to people associated with ICT projects and achieved results through them (Rediff.com 1999; Wilson 1996). In 2000, for instance, he set up an IT Steering Committee to advise AP on e-governance and persuaded India’s three leading IT entrepreneurs-- Azim Premji of Wipro, N.R. Narayana Murthy of Infosys and Ramalinga Raju of Satyam Computers- to come on board (Chanda 2000).

Businesses that adopt ICTs are arguably more likely to have CEOs with positive attitude towards and more innovative and knowledgeable about ICTs (Thong and Yap 1995). Such CEOs are also more likely to implement an aggressive ICT policy (Ettlie 1990). Naidu’s experience with ICTs thus became the most valuable asset for AP’s ICT development.

Naidu was known as a "laptop minister" when he was elected as the chief minister (Field 2000). Like a real CEO, Naidu made strategy and business plans using ICTs (Mehta 2001). In
1998, he assigned McKinsey to prepare 'Vision 2020', to define the strategy to realize the goals of the State. 14 task forces had submitted their reports defining the sectoral visions and the strategies. The government planned to have a similar exercise for lower administrative units.

**Process vs. Variance Theory**

As it will be clear shortly, the approach to explanation of this paper satisfies the characteristics of *process theory* rather than *variance theory* (Mohr 1982). Since the time ordering among the contributory events is critical in the process theory, we discuss the major events that led to the current state of AP’s IT development in chronological order.

**MAJOR PHASES OF AP’S ICT DEVELOPMENT**

After careful analysis of events that led to AP’s ICT development, six phases emerged (Table 4).

In the first four phases (1947-1989), the central government played more prominent roles whereas the state government’s role became important in the last two phases. As we mentioned earlier, the 1990 economic liberalization led to the decentralization of power to the state. Major events in the last two phases are presented in Appendix 1. Table 5 presents value, beliefs and experiences of central and state “CEOs” that influenced AP’s IT trajectory.

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1948-65: The Planning Phase

**Socialistic Planning Model Starts**

Fabian socialism\(^5\) influenced Nehru, the first prime minister (1947-64) of independent India. After his Russia visit in 1927, he turned into a Marxist; regarded socialism as the panacea; and
distrusted business (Joshi and Little 1994). Russian Planning model, thus, inspired Nehru. The central planning committee decided who would produce and how many units (Cox 1996).

Unlike East Asia, where market openness led to technology transfer, India was one of the world's most inward-looking economies with a complex web of restrictions on private capital and technology (Wall Street Journal 1990). The market was highly protected with import tariffs up to 300% and was restricted from competition (Cox 1996). Nehru’s bent to socialism also led to a series of events contributing to distrust between India and the U.S. and hampered U.S. aid and investment in India.

**IITs Founded to Support the Socialistic Model**

Indian Institute of Technology (IIT) campuses were established to meet the demand of engineers needed in the construction infrastructures planned in the socialist model. IITs were modeled on the Massachusetts Institute of Technology and represented one of the cornerstones of Nehru's self-sufficiency program. In 1951, UNESCO provided funds to build the first IIT campus in Kharagpur, near Calcutta.

Subsequently more IIT campuses were established. In 1956, West Germany offered assistance to set up a higher technological institute in India. Indo-German Agreement was signed in Bonn in 1958 to establish an IIT campus at Madras. The U.S., Britain, and the Soviet Union also provided supports for the expansion of IITs (Business week 1998). Although AP has no IIT campuses, IIT graduates have played increasingly important role to put AP on the global ICT map.
Computers Introduced to Support Centrally Planned Economy

Computers were first introduced in the mid-1950s to help data processing for five-year plans. The first machine was a British-made HEC-2M imported in 1955 (Subramanian 1992). IBM entered India in 1951; signed up manufacturing agreement in 1958 and started manufacturing in 1962. IBM 1401 computers were introduced in India in 1964. By 1974, India became IBM's biggest operation in South and East Asia.

1965-84: Socialism, nationalism and xenophobia Phase

Wave of Socialism, Nationalism, Economic Xenophobia

Lal Bahadur Shastri became prime minister in 1964. He was identified with the interests of the working class. He placed even higher emphasis on national stability than on economic growth. Lindblom (1966, pp. 251-252) notes:

… Indian policies are often hostile or indifferent to growth not because of oversight or folly but because other objectives stand in the way of growth. Of all these, the Indian desire for national political unity ..is foremost… Praiseworthy as is the ambition for democratic national unity, there can come a point at which its pursuit is at such a cost to growth that one believes both objectives cannot be simultaneously achieved……There is as yet no major political leader, however who acts as though he perceives the possibilities of combining the two objectives in a new coalition of political forces. Nehru himself seems to have thought in “either or” terms; Shastri has perhaps gone no further than to see, negatively, that too little growth can undermine national political unity and stability…. (Emphasis added).

Indira Gandhi became the prime minister in 1966 and new waves of socialism and economic xenophobia started to build up (McDonald 1992). She further shifted institutional norms to a forced distributive justice taking the command economy to its crest (Iyer 1997). Using the slogan “garibi hatao” (abolish poverty, overtly stated goal), she nationalized banks and other industries, increased price and trade controls, and squeezed foreign investment. Thanks to a protected domestic market, Indian companies never spent on R&D or improve the quality of goods and services (Kumar 1996).
Multinational Corporations (MNCs) Forced to Leave India

The 1973 Foreign Exchange Regulation Act (FERA) imposed restrictions on locally incorporated companies with foreign equity holding in excess of 40 percent°. The unwritten mantra of “Thou shalt not consume foreign products” reached its crest in 1977 when Bharatiya Janata Party came in power (Asia Inc 1994). This government asked Coca-Cola to reveal its secret formula and IBM to license its technology to Indian firms. Consequently, yhese MNCs closed their Indian businesses.

Following IBM’s departure, 1,200 software personnel were released into the Indian market. Many of them started small software houses. The government also established Computer Maintenance Corporation (CMC).

1984-90: Early Spark Phase

Indian ICT Industry Gets a Big Push

Rajiv Gandhi became the Prime Minister in 1984. He had knowledge of computers and brought his analytical mind to India's problems (Crook 1991). He promised Indian voter modernization based on ICTs (Gupta 1989, p. 35).

Some academics refer perestroika to describe Rajiv’s new economic policies (Mehta 1994). Like Gorbachev, he believed that the good of the country required him to open the economy to free enterprise, introduce a modern streamlined management style, and clean up corruption. These measures required attacking political and economic problems irrespective of the personal and political costs.
National Policy for Strengthening the ICT Sector

Gandhi appointed a market-minded political ally, V.P. Singh as the Finance Minister and three critics of government controls in the planning commission reporting directly to him. The planning commission is the source of reforms including freer computer and electronics imports, tax cuts, lower tariffs (Gigot 1985).

A computer policy announced in 1984 allowed 30% of excess software export earning to use for trade promotion. Companies with over 51% foreign equity were permitted for 100% export oriented units; software exporters are permitted joint ventures and/or marketing subsidiaries and offices abroad for promotion of software exports. The software sector was exempted from excise duty.

Foreign ICT Firms Start to Enter India

MNCs in the ICT sector started to enter India. In 1985, Citibank established a fully-owned, export-oriented, offshore software company in the Santa Cruz Electronics Export Processing Zone (SEEPZ) in Bombay (Lateef 1997). Further evidence of the changed attitude came in 1986 when Texas Instruments (TI), proposed to establish a 100% export-oriented, foreign owned and operated subsidiary (its first outside the U.S.). The DOE and the government quickly processed the license notwithstanding the laws that prohibited such license. Evans quotes a DOE official: "We broke 26 separate rules to accommodate TI's Bangalore subsidiary and are willing to break more" (1992, p. 7).

STP Units and NASSCOM Established

In Software Technology Park (STP) units, 100% export-oriented firms get a tax-free status for five years within the first eight years of operation and import hardware for duty-free. The scheme
became operational in 1988 and three STP units were established in 1990 in Bangalore, Bhubaneshwar, and Pune. AP lacked strong leadership and thus benefits of ICT friendly policies of the central government accrued to other Indian states.

In 1988, 38 members started the *National Association of Software and Services Companies* (NASSCOM), a non-profit organization, at the national level. NASSCOM’s aim is to facilitate software and services business and to encourage R&D. It has been active in providing inputs to the government, seeking improvements in infrastructure for producing software, and promoting exports (Nidumolu and and Goodman 1993).

**Future CEO of AP “Discovers ICT”**

Since CEO’s characteristics, qualities (Rothwell 1977) and experience (Smith et al. 1996) influence overall management style of a business, even more crucial, perhaps, was Naidu’s computer adoption. In the AP front, Naidu became the General Secretary of Telugu Desam Party in 1985 (Field 2000). In the same year, he got his first PC and set about reorganizing public policy. As he rose through party ranks, he became known for his computer-generated presentations and pursuit of streamlined government processes through ICTs.

**1990-94: Liberalization Phase**

**Liberalization at the Crest**

The USSR, the source of India’s political leaders’ value systems, underwent significant transformation in the late-1980s. Pressure for change was also building in the Indian policy landscape. India experienced widening fiscal deficit, the depletion of foreign exchange reserves, the balance of payments crisis, and the impending default on foreign debt repayment. India dismantled socialism in 1991 after over four decades of “astonishingly autarkic” protection
The reform was “more out of compulsion than out of conviction” (Narayan 1999).

In July 1991, India issued a new industrial policy statement which welcomed foreign direct investment (FDI) in India’s industrial development. It abolished import licensing and brought massive measures to lower tariffs and non-tariff barriers. The highest tariff rate came down to 45% and the average less than 25%.

The private sector became an active participant in the telecommunications sector. Indian foreign investment regime became as liberal as in other developing Asian countries. The change in law and attitude is reflected in the fact that Coca-Cola, Exxon, and IBM all returned to India. New investments in 1993 crossed $1 billion compared to $100 million in 1990-1991 (The Futurist 1994).

The reform also led to significant decentralization of power. Before 1991, even trivial decisions were centralized (Wall Street Journal 1990). For instance, to get a license, it took 30-40 trips to Delhi and up to two years. Licenses were no longer needed to import most products and a company could get a license in half a day in the same city (Borrell 2000).

**ICT Companies Start Investment**

Policy reforms of the mid-1980s mainly facilitated body shopping on-site (Indian programmers working at the client site). The shift to offshore production, allowing the programmers to work at facilities in India, was possible following the early 1990s’ reforms, particularly removal of licenses on imports of industrial equipment and the establishment of the STPs (Saxenian 2000).

In 1991, the government approved Tata Industries’ 50:50 joint venture (JV) proposal under the new economic policy. Tata Information Systems Ltd. (TISL) was established in 1992.
Similarly, in 1992, IBM India started a research lab in Delhi and a computer systems integration centre in Bangalore. TISL began marketing IBM’s products, solutions and services. IBM thus became one of the earliest MNCs to reenter India (Heim 2000). IBM Learning Services India set new standards for ICT education and training.

1995-98: Preparatory Phase

Preparation to go Hi-tech

After becoming the AP chief minister in 1995, Naidu started taking measures to put Hyderabad in the global ICT map. He started computerizing government machinery and attacked impediments to ICT growth.

To attract ICT investment, AP government started two mega-projects: Cyber City and Hi-tech City. The Cyber City consisted of 10 acres for industrialists who wanted identity of their own. They were given land to develop and the government provided minimum infrastructure. By the early 1997, a dozen companies, including SQL star, Infotech, Infosystems and Intelli Group Asia, were allotted land. AP Industrial Infrastructure Development Corporation (APIIDC) and Larsen and Tubro jointly developed Hi-tech City, adjacent to the Cyber City. The $850 million, 10-story building is the largest of its kind in India.

New problems in Bangalore such as congested roads; increasing rents; power outages started becoming commonplace. Companies that hadn’t established a presence in India started looking elsewhere to set up operations (McLaughlin 2000). They viewed Hyderabad as a viable alternative. By 1997, ICT companies as Baan Info Systems, Citicorp, D.E.Shaw and Freesoft had operations in AP (Business India 1997).
Naidu also envisaged a University of Information Sciences, an autonomous university to be run by industry. He wrote Bill Gates a personal letter inviting him to join hands in the proposed University (Business India 1997).

**Wooing Microsoft**

In March 1997, Microsoft’s Gates visited India. Naidu got an exclusive audience with Gates at a dinner party in New Delhi. Naidu discussed his vision of ICT’s role in government, and his dream of seeing his Hyderabad as a global ICT hub.

Naidu-Gates relationship flourished over time. In October 1997, Gates offered to depute a senior manager to help AP firm up its ICT programs. Gates wrote: “I am personally excited about your Information Technology Vision Group for Andhra Pradesh. As a software technology leader, I believe we can contribute to this group. If you agree, I would be happy to nominate one of my senior managers to participate in this group” (Rediff.com 1997).

In November 1997, AP government signed an agreement with Microsoft to establish the Microsoft School for Software Technology (MSST) as part of the Indian Institute of Information Technology (IIIT). MSST is South Asia's first competency center for software, systems, and application engineering skills. AP Government agreed to provide the necessary infrastructure to Microsoft through IIIT. Microsoft installed state-of-the-art requisite systems and positioned highly skilled and qualified trainers for the school. Microsoft planned to train 1500 people at the MSST in three years.
1998-2004: Take-off Phase

Microsoft Enters Hyderabad

A SWOT analysis conducted by Baan in the mid-1990s indicated that overcoming the poor image of Hyderabad was a prerequisite to attracting foreign investors. A Baan executive said, "Hyderabad can achieve a quantum leap only if a leader like IBM comes here. Then one will see the multiplier effect" (Business India 1997).

After a detailed assessment of several countries for its new product development center, Microsoft chose India. In a comparison of seven Indian cities on 20 factors, Hyderabad scored the highest\(^\text{14}\). AP Government reportedly responded to some of Microsoft’s demands within a single day, even though it was a holiday. In March 1998, Microsoft conveyed to the AP government its decision to open a Software Development Center at Hyderabad. In August 1998, Microsoft launched its Indian Development Center (IDC) at Hyderabad for the development of core technologies like Windows NT and Microsoft Back office\(^\text{15}\).

The software development center at Hyderabad developed rapidly (Table 6). In April 2000, Microsoft’s IDC Hyderabad launched its Microsoft Windows Services for UNIX 2.0 (SFU). It was completely designed and developed in IDC Hyderabad for the global market (Rediff.com 2002). IDC Hyderabad also developed the Microsoft Windows SFU 3.0.

Table 6 here

During his AP visit in September 2000, Gates announced a $50-million investment in its IDC, Hyderabad. He also committed $1 million per year for five years to promote India’s rural ICT education program. Gates again visited India in November 2002 and announced $400 million investment in India, $100 million of that for IDC, Hyderabad.
Chain Reaction of Microsoft’s Move

Microsoft’s entry strengthened AP’s importance in the global ICT map and triggered a chain reaction. Shortly after Microsoft’s decision, Oracle decided to invest in the Hi-Tec City. In June, 1998, Oracle and the AP government gave a joint press release on Oracle’s decision to invest $10 million in AP. In October 2002, Oracle acquired eight acres of land and announced its plan to invest $20 million over in five years. The fully developed facility is expected to house 3,000 professionals, primarily involved in e-business application development for the company's global customer base (Reddy 2002). The Oracle School of Advanced Technology is a part of the company's technical education initiatives.

In February 1999, AP Government and London-based WorldTel enter into an MoU to develop Internet community centers in AP, aimed at providing information to common citizens at affordable rates. Motorola started new software center for designing the next generation wireless solutions with emphasis on CDMA handsets, 3G systems and network management solutions for satellite communications with 60 professionals which had plan to grow to 400 professionals by 2002. It invested $5 million in the first year of operations and planned to invest $3-4 million per year in the coming years. The Hyderabad software center represents one of the 10 Motorola software centers around the world (Computer Today 1999).

In June 1999, AP Industrial Infrastructure Corporation Ltd (APIIC) and GE capital signed a Memorandum of Understanding (MoU) to provide 30 acres of land to establish IT-enabled services facility. GE Capital planned to employ 4,000 professionals within three years and planned to work on a variety of projects. Similarly, in November 1999, Ericsson commissioned its new software design center in Hyderabad for designing and developing software for its new generation Internet and datacom networking products worldwide.
By the early-2000, IBM, Lumley Technology, Toshiba, Metamor, Baan, DE Shaw, and Ericsson had operations in Hyderabad. HSBC (formerly the Hongkong and Shanghai Banking Corporation) has set up its software development center and disaster management and customer services centre.

**International Networking and Promotion**

Naidu also appropriately combined marketing, networking and promotion to locate and attract ideal partners for the development of AP’s ICT industry. In September 1998, he visited the U.S. for two weeks. During this visit, he met the World Bank President, Governor of New Jersey and high ranking officials of IBM, Microsoft, GE, HP, Sun Microsystems, Cisco, Teledesic, Oracle, Morgan Stanley, DII of San Francisco, Oxbridge, Invensye Technologies, Cybertech International, Stevedoring Services of America and AMOCO. Naidu also visited Japan and China in 2000 and focused on attracting investments in the hardware sector (Charya 2000).

AP government also started employing the State’s strategic location as *a unique selling proposition* and persuaded foreign investors to utilize Hyderabad as the transit hub between Europe and the Far East (Charya 2000). Companies that have development centers in Hyderabad point out its strategic location that provides easy access to all part of the world as one of the important factors for their selection (Prasanna 2001).

**Naidu’s National Popularity Skyrockets**

Naidu’s popularity in India increased rapidly mainly because of his clear ICT vision. People in India began to refer to him as “India’s best and the only CEO with a 21st century vision”. Naidu is described as “India's highest-profile computer geek” (Gilley 1998), “one of a rare, new breed” (Sidhva 1998) of Indian politicians and “the most Internet-savvy” (Rao 1999). A source noted
that of all the chief ministers of Indian states, “none has more snap, crackle and pop” than Naidu (The Economist 1999).

In 1998, *The Economic Times* voted Naidu as the *Business Person* of the year. While presenting the award, the citation mentioned "it is a vote for reform, for a politician who means business and sees himself as a Chief Executive and his people as shareholders"\(^{16}\). He was also awarded “IT Man of the Year” from Computer World in 1999; and was voted as the “IT Indian of the Millennium” in 1999. Naidu was also designated as the Co-chairperson of the National Task Force on IT set up by the Government of India to prepare the ICT road map for the future.

**AP as the Epicenter of Global Political Attention**

Naidu’s “corporate” commitment and distinct leadership style triggered his popularity at the International level as well. The World Bank President, while addressing the Governors of the bank in 1998, praised AP’s ICT initiatives. The Economist on May 22, 1999 stated: “Naidu, the visionary Chief Minister of Andhra Pradesh, is trying to make government more transparent and responsive by making it more electronic”. In December 1999, Naidu was voted as Time’s *South Asian of the Year* (Ghosh 1999).

During his India visit in 2000, U.S. President Bill Clinton visited Hyderabad instead of the more famous “software plateau” of Bangalore (Field 2000). Indian ambassador to the U.S. was told six months prior to Clinton’s visit that “if the president was keen to meet somebody in India, it was Chandrababu Naidu” (Mehta 2001).

In October 2000, Naidu was in the list of the *top 25* of Asia’s Digital Elites. He was the only politician in the list who made outstanding contribution to IT. Naidu's successes made him a hit for the World Economic Forum meetings. He moderated panels and was praised as an
example for other leaders of poor regions. In January 2001, Naidu visited Dubai to address the Organization of Economic Cooperation and Development (OECD) on e-governance. Naidu was even accorded accolades as a business academic – with an adjunct faculty status at Northwestern University’s Kellogg School of Management for some time.

Resistance to ICT Overcome
ICTs threatened bureaucrats’ jobs and were perceived as incompatible with their daily routines including extracting bribes. They vigorously opposed Naidu’s ICT plans and protested against computerization by threatening an indefinite strike in 1999. Naidu, however, motivated the bureaucrats to champion ICT usage in their departments. The resistive force from the bureaucrats disappeared – in fact, transformed into one of the strongest drivers of AP’s ICT development process – because of the compensatory rewards such as strong support and recognition from the Chief Minister and likely approbation from the public (Bhatnagar 1999). Many bureaucrats were labeled as ex-officio ICT secretaries. They shared common platforms of views on ICT issues and spoke the same language in public forums (Bhatnagar 1999). Such parallelism had reinforcing and cementing effects on the different groups of stakeholders.

DISCUSSION AND CONCLUSION
The AP story provides a classic example of the dynamics possible in the ICT landscape of an emerging economy that has a capable CEO. In terms of the mechanism of influence of the top management team on organizational outcome, the demography model seems to be the most appropriate. In AP’s ICT trajectory, the incremental contributions of factors such as social integration and communication are very little compared to the roles played by the CEO.

AP’s ICT trajectory presented in this paper satisfies the characteristics of the process theory. Table 7 presents how process theory differs from variance theory along various
dimensions. First, the “precursors” in this paper are *necessary but not sufficient* conditions for the outcome. For instance, AP government’s efforts would not have produced results in the absence of *deep structural factors* such as emphasis on education by South Indian families, higher marriage market value of IT graduates in India; cosmopolitan character of the city; central location; and moderate cost of living. Second, the paper deals with *discrete states and event* such as the socialistic planning model, nationalization of companies, and decentralization of power rather than variables. Third, in Aristotle’s reasoning, this paper deals with the final causes, which are end points and the existence of each “connotes the occurrence of certain prior events” (Mohr 1982, p. 58). Fourth, the time ordering among the contributory events (Appendix 1) is critical. For instance, Naidu’s measures would have little impact in the absence of decentralization of powers and the economic liberalization.

*Table 7 here*

The explanatory powers of the three perspectives — *functional, political and social* — varied over time. The *social perspective* explains the decisions taken in the *Planning Phase*. The perceptions and behavior of Nehru seem to be strongly influenced by the USSR model of central planning. Nehru’s proximity with the USSR leaders had strong influence on the selection of such model.

The *political perspective* explains outcomes in the *Socialism, Nationalism and Xenophobia Phase*. Implementation processes and outcomes in this phase were influenced by “political criteria” (Franz and Robey 1984). Shastri, for instance, viewed that “too little growth can undermine national political unity and stability”. Similarly, Indira Gandhi’s policies were
guided by the overtly stated goal of abolishing poverty. Inward looking policies of the central government hampered AP’s, and other Indian states’, ICT growth.

Gradually the functional approach explained AP’s ICT model as planners started emphasizing ICT as an essential tool for economic development and cost-effective management of resources. Rajiv Gandhi, for instance, believed that computerization was the best way to mobilize national resources. The functional perspective became more prominent in the Preparatory Phase and the Take off Phase. In these two phases, the vision of turning Hyderabad into Hong Kong guided Naidu’s strategies.

The research we have reported has a number of policy implications. The analysis indicates that functional perspectives of ICT implementation – focusing on costs, benefits and performance – are likely to take root in political entities that have a CEO-like leader with a clear ICT vision. The existence of CEOs that lack computer experiences and/or have values and beliefs incompatible with ICT co-varies positively with the dominance of social and political perspectives of ICT development. CEOs with appropriate experience and expertise can identify the missing elements required for ICT development and acquire them. In the AP case, for instance, to acquire the critically missing component — capital — the government employed marketing, networking and promotion and expedited decision-making processes. The government was also able to invent hidden resources such as AP’s strategic location and sell them to potential investors. The AP case also indicates that a distinct leadership style can attract the attentions of various stakeholders such as investors as well as national and international policy makers.
Epilogue

Under the parliamentary system, the ruling party can call a snap election any time. In 2004, riding on the euphoria of a surging ICT-driven Indian economy, the ruling BJP-led coalition called for a snap election to consolidate its power. The results were totally contrary to expectations – the BJP coalition lost seats and the Congress Party-led coalition came to power on a populist platform. One of the fallouts of this was that Naidu and his party lost in AP. While the capital city of Hyderabad was home of over 95% of the ICT units in the state, the rest of the state did – which had the majority of the voters – did not see too many percolating benefits. They voted Naidu out. The economic success and ICT agglomeration that Naidu created, however, have a momentum of their own and AP continues to grow as a major ICT hub.

References


India Telecom, 2003. IITian network to turn India into technology hub. March 3,


STPI, Hyderabad, 2001a. *Information on IT industry in Hyderabad*, Software Technology Parks of India, Hitec City, Hyderabad.


Figure 1: Influence of Federal and State-level Top Management Team on AP’s ICT Trajectory

- Values, beliefs and experiences of top management team at the federal level (India) (Stage 1-4)
- Values, beliefs and experiences of CEOs top management team at the state level (AP) (Stage 5-6)

ICT trajectory of India

ICT trajectory of AP

Table 1: Exports of IT Industry in AP by Software Sector: 2000

<table>
<thead>
<tr>
<th>Sector</th>
<th>Percent Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-commerce/web application</td>
<td>29.14</td>
</tr>
<tr>
<td>Applications software</td>
<td>25.65</td>
</tr>
<tr>
<td>ERP/client server</td>
<td>11.15</td>
</tr>
<tr>
<td>System software</td>
<td>8.91</td>
</tr>
<tr>
<td>IT Enabled services</td>
<td>8.15</td>
</tr>
<tr>
<td>Consultancy services</td>
<td>6.15</td>
</tr>
<tr>
<td>CAD/CAM/GIS</td>
<td>4.38</td>
</tr>
<tr>
<td>Communication software</td>
<td>3.47</td>
</tr>
<tr>
<td>Very large scale integration (VLSI) chip designing &amp; embedded software</td>
<td>2.64</td>
</tr>
</tbody>
</table>

Source: IT People (August 27, 2001); STPI Hyderabad (2001a, b)
Table 2: Export Destinations of Software from AP: 2000

<table>
<thead>
<tr>
<th>Region</th>
<th>Percent Share</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA and Canada</td>
<td>69.15</td>
<td>The US is the world’s largest software market that accounted for half the world software sales in the last decade. Moreover, American IT and financial services companies have geared up much faster than their European counterparts to exploit the advantages of offshore programming.</td>
</tr>
<tr>
<td>Europe</td>
<td>11.80</td>
<td>Reflects colonial ties, especially with UK</td>
</tr>
<tr>
<td>Middle East and Asia</td>
<td>6.39</td>
<td>Reflects international connections due to decades-long trend of emigration of skilled labor and professionals from India to Middle East and Southeast Asia</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5.67</td>
<td>Reflects the presence of Baan software center. Baan was acquired by UK-based Invensys PLC. in September 2000</td>
</tr>
<tr>
<td>Japan</td>
<td>4.28</td>
<td>Language and cultural barriers are hindering the growth of IT exports to Japan.</td>
</tr>
<tr>
<td>Australia</td>
<td>1.02</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1.69</td>
<td></td>
</tr>
</tbody>
</table>

Source: IT People (August 27, 2001); STPI Hyderabad, The Economic Times (2000)

Table 3: Growth of ICT Industry in STPI, Hyderabad

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of STPI units</th>
<th>Export (Million US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operating</td>
<td>Approved</td>
</tr>
<tr>
<td>1995</td>
<td>31</td>
<td>60</td>
</tr>
<tr>
<td>1996</td>
<td>46</td>
<td>88</td>
</tr>
<tr>
<td>1997</td>
<td>70</td>
<td>112</td>
</tr>
<tr>
<td>1998</td>
<td>106</td>
<td>194</td>
</tr>
<tr>
<td>1999</td>
<td>359</td>
<td>977</td>
</tr>
<tr>
<td>2000</td>
<td>674</td>
<td>1206</td>
</tr>
</tbody>
</table>

Source: STPI Hyderabad (2001b) and authors’ calculation. Export figures are converted from Rupees into US dollars by taking the exchange rates for the respective years from Euromonitor (2001)
Table 4: Six Phases of AP’s ICT Trajectory

<table>
<thead>
<tr>
<th>Period</th>
<th>Phase</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948-64</td>
<td>Planning phase</td>
<td>o Socially planning model gets started</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o IITs founded to support the socialistic model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Computers introduced to support the centrally planned economy</td>
</tr>
<tr>
<td>1964-84</td>
<td>Socialism, nationalism and xenophobia phase</td>
<td>o The wave of socialism, nationalism and economic xenophobia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o MNCs compelled to leave India</td>
</tr>
<tr>
<td>1984-90</td>
<td>Early Spark Phase</td>
<td>o Indian IT industry gets big push</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o National policy toward strengthening and fostering the IT sector</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Body shopping recognized</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Foreign IT firms start to enter</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o STPI and NASSCOM established</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Future CEO of AP discovers IT</td>
</tr>
<tr>
<td>1990-95</td>
<td>Liberalization Phase</td>
<td>o Liberalization at the crest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o IT companies start operations in India</td>
</tr>
<tr>
<td>1995-98</td>
<td>Preparatory Phase</td>
<td>o Preparation to go hi-tech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Wooing Microsoft</td>
</tr>
<tr>
<td>1998-2004</td>
<td>Take-off Phase</td>
<td>o Microsoft enters Hyderabad</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Chain reaction of Microsoft decision</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o International networking and promotion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Naidu’s national popularity skyrockets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o AP as the Epicenter of global political attention</td>
</tr>
<tr>
<td></td>
<td></td>
<td>o Resistance to IT overcome</td>
</tr>
</tbody>
</table>
Table 5: Selected Central and State-level “CEOs” and Their Value Systems

<table>
<thead>
<tr>
<th>CEO</th>
<th>Value system, belief, experience</th>
<th>Major actions and impact on AP’s IT industry</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| Nehru (1947-64)      | • Believer of Fabian socialism with Marxist sympathies  
• Admirer for Russian planning  
• Distrust of business and ignorance of the allocational role of price mechanism  
• Genuine concern for the poor | • Combined Soviet heavy-industry planning model with the British-designed license-permit system.  
• IITs were founded to support the socialistic model  
• Computer introduced to support the centrally planned economy |                                                                                                           |
| Lal Bahadur Shastri  | • Interests of the working class  
• Relatively higher emphasis on national political unity and stability compared to economic growth | • Believed that too little growth can undermine national political unity and stability.                      |                                                                                                           |
| Shastri (1964-66)    |                                                                                                |                                                                                                              |                                                                                                           |
| Indira Gandhi (1966-77) | • Socialist  
• Distributive justice  
• Authoritarian | • Nationalized banks and several other industries  
• Increased price and trade controls  
• Squeezed foreign investment |                                                                                                           |
| Morarji Desai (1977-79) | • Belonged to Bharatiya Janata Party, a rightist, Hindu-chauvinist party that emphasizes Indian nationalism | • Asked Coca-Cola to reveal its formula and IBM to license its technology to Indian firms  
George Fernandes, No 2 in the Cabinet and industry minister played a major role. |                                                                                                           |
| Rajiv Gandhi (1984-89) | • “Outsider” to Indira Gandhi  
• Eager to listen to new ideas  
• A technocrat with an analytical mind | • Introduced new policies for electronics, software, telecommunications, and other emerging industries |                                                                                                           |
| Naidu (1995-2004)    | • Hard working  
• Worked like a company CEO  
• Ready to give wide publicity to team members  
• Experience with computer  
• Focused efforts | • Vision 2020 prepared  
• Able to attract major IT companies in Hyderabad |                                                                                                           |

Sources: Joshi and Little (1994), Lindblom (1966), and authors’ research.

Table 6: Growth of Microsoft Software Development Center, Hyderabad

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of employees</th>
<th>Investment ($, million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>1999</td>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>2000</td>
<td>85</td>
<td>50</td>
</tr>
<tr>
<td>2002</td>
<td>175</td>
<td>100</td>
</tr>
<tr>
<td>2003</td>
<td>300 (estimate)</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>500 (estimate)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Rediff.com (2002), The Economic Times (2000), and authors’ research
Table 7: Process Theory vs. Variance theory

<table>
<thead>
<tr>
<th>Process theory</th>
<th>Variance theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precursor is a necessary condition for the outcome</td>
<td>Precursor is a necessary and sufficient condition for the outcome</td>
</tr>
<tr>
<td>Deals with discrete states and events</td>
<td>Deals with variables</td>
</tr>
<tr>
<td>Deals with a final cause</td>
<td>Deals with efficient causes</td>
</tr>
<tr>
<td>Time ordering among the contributing variables is critical for the outcome</td>
<td>Time ordering among the contributing variables is immaterial to the outcome</td>
</tr>
</tbody>
</table>

Source: Adapted from Mohr (1982, p. 38)

Appendix 1: AP’s ICT Development Chronology, 1995-2004

<table>
<thead>
<tr>
<th>Month/Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 1995</td>
<td>• Naidu is unanimously elected as the AP chief minister.</td>
</tr>
<tr>
<td>1997</td>
<td>• The Hyderabad IT Engineering Consultancy City (HI-TEC City) project starts as a JV between Larsen and Turbo (L&amp;T), and the APIIC.</td>
</tr>
<tr>
<td>March 1997</td>
<td>• Microsoft’s Bill Gates visits India and meets Naidu.</td>
</tr>
<tr>
<td>October 1997</td>
<td>• Gates offered to depute a senior manager to help AP firm up its IT programs.</td>
</tr>
<tr>
<td>November 1997</td>
<td>• AP government and Microsoft sign an MoU to establish the Microsoft School for Software Technology (MSST) as part of the IIIT.</td>
</tr>
<tr>
<td>March 1998</td>
<td>• Microsoft announces the set up of its R&amp;D center in Hyderabad by the end of 1998.</td>
</tr>
<tr>
<td>May 1998</td>
<td>• Naidu becomes a co-chairperson of the Prime Minister's Task Force on IT and Software Development.</td>
</tr>
<tr>
<td>July 1998</td>
<td>• Naidu secures $350 million World Bank loans for investment in roads and computers.</td>
</tr>
<tr>
<td>August 1998</td>
<td>• Naidu receives the award: the Business Person of the Year.</td>
</tr>
<tr>
<td>September 1998</td>
<td>• Naidu refuses an offer of Indian Prime Ministership.</td>
</tr>
<tr>
<td>October 1998</td>
<td>• Indian Institute of Information Technology (IIIT) starts its operations.</td>
</tr>
<tr>
<td>November 1998</td>
<td>• Naidu’s makes a 14-day trip to the US.</td>
</tr>
<tr>
<td>February 1999</td>
<td>• Oracle School of Advanced Software Technology inaugurated in the IIIT.</td>
</tr>
<tr>
<td>June 1999</td>
<td>• Indian Prime Minister inaugurates ‘Cyber Towers’.</td>
</tr>
<tr>
<td>September 1999</td>
<td>• Naidu's party wins the election.</td>
</tr>
<tr>
<td>November 1999</td>
<td>• Ericsson commissioned its new software design center in Hyderabad.</td>
</tr>
<tr>
<td>December 1999</td>
<td>• Naidu is voted as Time's South Asian of the Yea.</td>
</tr>
<tr>
<td>March 2000</td>
<td>• President Bill Clinton visits Hyderabad.</td>
</tr>
<tr>
<td>Sept 2000</td>
<td>• Gates announces a $50-million investment in Microsoft IDC, Hyderabad.</td>
</tr>
<tr>
<td>October 2000</td>
<td>• Naidu makes in the list of the Digital 25 of the Asia’s Digital Elite.</td>
</tr>
<tr>
<td>January 2001</td>
<td>• Naidu visits Dubai to address the OECD on e-governance.</td>
</tr>
<tr>
<td>February 2002</td>
<td>• HP and the AP government announced an alliance to build an HP i-Community.</td>
</tr>
<tr>
<td>May 2004</td>
<td>• Naidu loses the election.</td>
</tr>
</tbody>
</table>
Endnotes

1 Because the fiscal year ends in March, government statistics in India are reported in overlapping year formats. Thus, the reported end points of this period are 1996-97 and 2000-01. Since three-fourths of each “official year” falls in the first of the hyphenated calendar years, we have simplified the dating system throughout by using the first of the hyphenated calendar years.

2 In Cyert and March's analysis, top management team is the dominant coalition that helps establish the standard operating procedures and resolve conflict.

3 A state chief minister’s responsibilities in India are similar to those of a governor of a U.S. state.

4 Naidu lost the election in the May 2004 and was replaced as chief minister by YS Rajasekhar Reddy of the Congress party in AP. Reddy said: “Naidu only made five percent of the population richer. We raised the farmers' issue in the assembly, and Naidu ignored it”.

5 Fabian Society was an English reformist organisation of intellectuals, founded in 1884, named after the Roman General Quintus Fabius Maximus. They supported the idea that the transition from capitalism to socialism could be brought about by means of minor and gradual reforms.

6 See [http://www.iitm.ac.in/aboutiit/history.html](http://www.iitm.ac.in/aboutiit/history.html).

7 Over 100,000 Indians compete for the IIT entrance exams every year for 2,500 seats and 2,000 of them graduate each year (Business week 1998). Indian engineers and management experts, most of them from IITs, have founded over 40% of new enterprises in the Silicon Valley (India Telecom 2003). The popular American TV program 60 Minutes described the IITs as "the most important university you have never heard of". Similarly, Amazon.com's Jeff Bezos describes the IIT graduates as "world treasure". According to Bill Gates the computer industry has benefited greatly from them.

8 See [IBM India](http://www.prdomain.com/companies/i/ibm/backgrounders/pr_ibm_bgn.htm).


10 Sam Pitroda, a naturalized American electronic expert, renounced his US citizenship and returned to India in 1981. Pitroda believed that computerization was the only way to marshal resources and break the “lockhold” the local powerbrokers had over illiterate populations. He preached computerization with a missionary zeal. Rajiv Gandhi shared Pitroda’s modernizing vision and commitment to human resource development (Crossette 1993).

11 An STP is similar to a free trade zone but exclusively for software. The objectives of STP are to establish and manage the infrastructural resources such as data communication facilities, core computer facilities, build up space, and common amenities to provide services (import certification, software valuation, project approvals, etc) to the users who undertake software development for export purposes, to promote development and export of software and software services through technology assessments, market analysis, marketing support, etc; and to train professionals and to encourage design and development in the field of software technology and software engineering (Government of India 1995).

12 See [IBM India](http://www.prdomain.com/companies/i/ibm/backgrounders/pr_ibm_bgn.htm).

13 [http://www.the-week.com/97nov02/events5.htm](http://www.the-week.com/97nov02/events5.htm)


17 Arguably if the potential users of a technology are satisfied with current routines, they resist it (Ram 1985).

18 Proximity need not be spatial; it could also be derived from interactions (Rogers and Kincaid 1981).
Founded in 1892, the University of Rhode Island is one of eight land, urban, and sea grant universities in the United States. The 1,200-acre rural campus is less than ten miles from Narragansett Bay and highlights its traditions of natural resource, marine and urban related research. There are over 14,000 undergraduate and graduate students enrolled in seven degree-granting colleges representing 48 states and the District of Columbia. More than 500 international students represent 59 different countries. Eighteen percent of the freshman class graduated in the top ten percent of their high school classes. The teaching and research faculty numbers over 600 and the University offers 101 undergraduate programs and 86 advanced degree programs. URI students have received Rhodes, Fulbright, Truman, Goldwater, and Udall scholarships. There are over 80,000 active alumnae.

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Our responsibility is to provide strong academic programs that instill excellence, confidence and strong leadership skills in our graduates. Our aim is to (1) promote critical and independent thinking, (2) foster personal responsibility and (3) develop students whose performance and commitment mark them as leaders contributing to the business community and society. The College will serve as a center for business scholarship, creative research and outreach activities to the citizens and institutions of the State of Rhode Island as well as the regional, national and international communities.

The creation of this working paper series has been funded by an endowment established by William A. Orme, URI College of Business Administration, Class of 1949 and former head of the General Electric Foundation. This working paper series is intended to permit faculty members to obtain feedback on research activities before the research is submitted to academic and professional journals and professional associations for presentations.

An award is presented annually for the most outstanding paper submitted.