

## *Research Brief*

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# R & D INFORMATION SYSTEMS AND TECHNOLOGY

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## INTRODUCTION: R & D INFORMATION TECHNOLOGY

- to talk IT R & D is to talk about technology advances
- what people working on time being spent
- prominent: info superhighway, VR, fuzzy logic, superMIPs

## TRENDS AND DEVELOPMENTS IN INFORMATION TECHNOLOGY & MANAGEMENT

1. hardware advances driven by HW vendors; high visibility
  - alternative data input: voice, character, recognition, symbols, pen computing
  - notebook, palmtop, PDA technologies, memory cards, color LCDs, micro drives, integrated chip sets
  - color, ink, laser alternatives to dot matrix
  - superMIPs, powerPCs, parallel processing
  - video resolution (+ RAM + disk + processor = workstation)
  - fault tolerance
  - CD ROM storage
2. software products and tools seeing major trends
  - KBs, AI expert systems
  - CASE (shoes for shoemaker's son)
  - data compression (related, video, image processing)
  - graphical user interface, windowing
  - OLTP-oriented DBMs
  - virus creation, detection
  - language translation
  - cross-platform interoperability multi-porting, interfacing to products on other platforms
  - road network geomapping
  - intelligence agents

- electronic and voice mail
  - robotics, machine PLC interfaces
3. telecommunication, develops also important
- LAN reach, capacity, reliability, maintainability
  - WAN commercialization, fiber optics, broadband
  - remote wireless communication
  - comm software ease of use, reliability, flexibility
4. advances in technology take-up, utilization
- capture, processing at point of first contact: sale, service, rejection, return, need, payment (rental car, hotel outlets, hospitals, meter reading)
  - factory automation, direct shop floor connection
  - microprocessor-driven intelligent devices
  - global reach: package delivery, newspapers, MNCs
  - hi-res fluid-motion multi-alternative games (VR)
  - multi-media: training, encyclopedia, real estate
  - scan data analysis
  - order customization (car sales)
  - unmanned retrieval systems: from vendor to cash to...
  - customer identification, preference tracking
  - connection: supplier, warehouse-floor-customer: Toys R Us, Domino's Pizza
  - optimization: transportation scheduling, shelving
  - executive decision support systems
  - location tracking: UPS, Xerox smart badge
5. advances in IS & T management techniques and approaches
- project, program management
  - estimating big complex efforts
  - host-based to client-server
  - rapid application development
  - requirement definition rigor
  - enterprise architecturing
  - systems development methodology
  - object orientation, reusability
  - design specification rigor, software factory
  - human computer interface
  - productivity, effectiveness measurements
6. R & D Centers
- Silicon Valley, Richmond, Utah, etc.
  - Japan, Inc. (Sharp, Mitsubishi, NEC)
  - Xerox Palo Alto
  - Bell Labs, Raychem, SRI, Motorola
  - IBM Research Facility (Fellows)
  - HBS (Porter), Other schools (measurements)
  - consulting groups (Andersen) gurus (Martin)

## Reviewing Local Situation (primarily U.S. driven; where is local resource focused?)

- offshore code construction
- good semiconductor assembly industry, DB services
- occasional burst in tools, products but ...
- government infrastructure; master planning, big SI
- nothing beyond academic exercises in ComSci
- copying worldwide private sector best practices

## R & D OPPORTUNITIES, PROBLEMS AND RECOMMENDATIONS

### 1. U.S. and International

- gifted tinkerer in garage, brainy nerd with home PC; no set-up, start-up, infrastructure cost for some areas
- connectivity, interfacability a moving target
- developments advancing too fast, wheel reinventing
- real long-term opportunities in solutions not detailedly frameworkable (Blockbuster video); time, cost, distance, quality, convenience, choice, familiarity
- standards lack across the HW, comm, SW boards
- what drives research: profit factor, lowest common denominator, maximum consumer reach
- mechanical reliability, field sturdiness, battery tech
- software piracy
- puny pay-off in information technology

### 2. Locally

- unique situation of zero tech intro time delay
- no critical mass to achieve excellence
- no consumer base to achieve growth, profit, more R & D
- school infrastructure missing, high entry cost
- tech component cost to tech application cost ratio
- technology utilization cost to clerical cost ratio
- IS development, support professionals in demand; drain
- lagging offshore image; behind India, Ireland
- diploma mill syndrome
- doing it right the first time -- in government?
- government support (funding) missing no Pinoy MITI
- components infrastructure missing no Taiwan Inc.
- opportunities remain in offshore programming, DB, technology application esp. vertical solutions

