Dynamics of High-Tech

Why did Minnesota develop the first computing industry, years before ‘Silicon Valley’ in 1971 ... and a leading medical-device industry? (1) innovative “industrial district” with specific linkages between older and newer industries: Engineering Research Associates (f. 1946) and high-tech skills of St. Paul’s Midway industrial district. (2) computer–medical device linkages in dataset of 245 high-tech firms [1980-2011].
Dynamics of High-Tech

A. Digital State: the book
B. Analysis: ‘industrial district’
C. High-tech innovation: St. Paul midway
D. Computer industry ↔ medical devices
E. Policy implications
A. Digital State: the book

- many ‘first’ computers [c. 1940-50]: Berlin, UK, Philadelphia, Princeton, [Iowa], Washington DC, St. Paul

- computer industry in MN by 1960:
  - computers (hardware + software)
  - 4 ‘anchor’ companies ... networks, engineers, restaurants, $ stock, VC

- MN = 3.3% mfg jobs, 12% $6B computer market, 17% computer mfg jobs [c.1975]
A. Digital State: the book

1. wartime origins: crypto, bombs, shells
2. ERA’s pioneering computer [f.1946]
3. Corporate computing at Univac
4. Control Data as innovation machine
5. Honeywell and ‘first computer’
6. IBM Rochester (Blue Gene in Keller)
7. MN’s info economy: jobs + internet
8. high-tech innovation: medical devices
A. Digital State: ‘on the shoulders’
B. Analysis: ‘industrial district’

- 5 chapters on ‘anchor firms’ [ERA...]
- ‘specialist auxiliaries’ and ‘ancillary industries’ plus ‘global enterprise’
- examine banks, Minneapolis Fed, UMinn, MN jobs + skills + strategy
- specific places (St. Paul’s Midway ➵ + suburbs + CDC’s inner-city + rural)
1500 large wooden gliders made at John Parker’s NAC factory in St. Paul’s Midway [= ERA site]
St. Paul’s Midway district (1923 map)
Engineering Research Associates: Plant #1 (c.1955)
ERA skilled machinist and magnetic drum (c.1955)
3M [ancillary industry] = spray-on iron ➤ ERA
magnetic drum rotor [c.1955] ➤ Imation [1996]
ERA engineers: Jack Hill, Arnold Cohen, Frank Mullaney, Bob Perkins, Arnie Hendrickson, Bill Keye
ERA drafting room: 6 women + 9 men
ERA 1103 rebranded ‘Univac Scientific’ to University of Minnesota [1958]
D. computers & medical devices

- anchor firms? weak links
  - Medtronic, St. Jude, Boston Scientific
  - L. Perlman Medtronic legal to CDC
  - Mike Mack engineer (‘rounds of firings’) Unisys to Medtronic [1997]

- global enterprises? mixed record
  - Benchmark (TX) buys EMD [1,800 jobs in Winona+Rochester 2011]
  - Bosch buys Telex [MN jobs ¼ by 2011]
D. computers & medical devices

1986 Medical Alley Directory:

- 36 firms ‘computers in medicine’
- specialist auxiliaries (electronics, computing, engineering): Argosy, Braemar, CMC Assemblers, Crest, Dahlberg, Microdynamics, Minnesota Wire, Remmele Engr, Waters Instruments
- medical info services + software
D. computers & medical devices

- Metalcraft Machine [Elk River] (f. 1978)
  - buys Chippewa cooling fins [1996]
  - specialist mfr medical tools [2001--]
- Hutchinson Tech (f. 1965 chicken coop)
  - circuit boards CDC, Univac, IBM
    - “driving to tool shops” in Mpls
  - hard drive ‘suspension assemblies’
  - BioMeasurement division [2001]
E. Policy implications of ‘districts’?

- ‘anchor firm’ bias in Gov. Arne Carlson’s 1991 “future of [existing] MN computer industry” (but no internet, no Gopher!)

- how to promote low-profile industry? ... sunset older high-profile industry?

- need awareness of ‘specialist auxiliaries’ (link from computing to medical devices ... to nano?)

- new image of MN’s computing jobs ...
Minnesota employment in computing (1980–2011)

US computer industry (NAICS:334)
1990–2010: 1.9–1.1 M

Univac, Control Data, IBM, Honeywell, successors: Unisys, Seagate, BT Syntegra, General Dynamics, Lockheed Martin
Minnesota employment in computing (1980–2011)

US computer industry (NAICS: 334)
1990–2010: 1.9–1.1 M

Hardware = SIC 3571/73 from Minnesota Directory Manufacturers (N=245)
Minnesota employment in computing (1980–2011)

Software = SIC 3572 from Minnesota Directory Manufacturers (N=245)
Digital State:
Industrial Districts and the Emergence of Minnesota’s High Tech Economy

Thomas J. Misa

Minnesota Supercomputing
Supercomputer Capital of the World

Thomas J. Misa

Minnesota’s Computer Industry: History, Legacies, Traces

Thomas J. Misa
SIA (St. Paul) 2 June 2013

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For more . . .

DIGITAL STATE

THE STORY OF MINNESOTA'S COMPUTING INDUSTRY

THOMAS J. MISA

MQ book sign 15 Nov. 7pm