Management of Technology

Guide to Personal/Career Development

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Management of technology has changed:

Technology changes faster:

1. Technology, roughly, doubles every two years, ie., you will have to know twice as much about technology two years from now, as you know today.
2. A new technology has a life expectancy, on average, of about 5 years, ie., the technologies you master today will be obsolete within 5 years.
3. Product life cycles, on average, are 8 months, eg., if it takes your company 8 months to design a product, you missed the market window.

Careers in technology have changed:

People make career changes more often today:

1. 10 years ago, 30% of all graduating students would retire from the company they joined upon graduation.
2. Today, the average duration of a "career" in a company is 14 months, ie., employee loyalty and company loyalty are, largely, a thing of the past. (For example, there are an average of 4000 jobs for engineers posted to ba.jobs each, and every, day!)
3. On average, a professional will change careers 5 times in a lifetime, ie., most engineers will be engineers for a little under a decade, and then change professions.

The corporate paradigm has changed:

1. Eternal, large, corporate research and development budgets are, for the most part, a thing of the past.
2. Corporate survival in the global marketplace depends on productivity rate:
   - Organizations must be “agile” in the marketplace.
   - Management architecture is “flat” with responsibility and authority “pushed down” into the organization.
   - Cost and time-to-market issues are the dominate priorities.
   - Modern organizations are made up of small, autonomous, self directed work teams of multi-disciplinary people that are electronically mediated, and geographically disperse.

Bottom line:

1. Managing technology is increasingly difficult.
2. Managing your career is **YOUR** responsibility-no one will do it for you.
3. Throughout your career, you will be competing in a global economic environment.

How do you do that?

You need a strategy.

The strategy:

1. I propose that you consider yourself a "technology broker," as opposed to a "technology applier."
   - This means that exploiting existing technology in new ways is more important than generating new technology.
   - This means that technology should be exploited for both commercial purposes, and to benefit your organization.
2. I propose that your long term career direction should be to move into financial responsibility as soon as possible.
   - This means to move into project management as soon as possible.
   - This means to assume financial responsibility for an organization, as soon as possible.

Your personal “network” of contacts:

1. Your personal “network” of contacts and people is your most precious career asset. (The following slide will elaborate.) Maintenence of your “network” will be your primary career responsibility, irregardless of what your career is.

2. You will have to avail yourself of all possible technical resources. (The next slide will elaborate.) By this, I mean to “leave no stone un-turned” concerning knowing all there is to know about something that may be of value to your career.

If you do both of these things well, your career will prosper. If you don’t, your career, (irregardless of what it is,) will, in time, fail, ie., there is no points for grace; it is not what you know, but who you know, and what you can do.

Foil 7, cont: "Contacts and people:"

Your contacts are a major asset to the company, ie., you can expect the company to finance the maintenence of your personal "network." (In point of fact, at the executive level, you are hired for your contacts.)

1. This includes professional organization dues and contributions.
2. This includes compensation for services rendered to professional organizations, (for example, publishing, holding office, etc.)
3. This includes financial contributions to Universities, (for example, technology programs, funded research, stipends, etc.)

As a note in passing, these items are what created the industrial complex we call Silicon Valley. (Re: Vannevar Bush, Frederick Terman, et al.)

Foil 7, cont: "Resources:"

Likewise, your technical resources are a major asset to the company, ie., you can expect the company to finance the maintenence of your technical resources. (In point of fact, at the executive level, you are hired for how fast you can assemble your resources to facilitate a corporate objective.)

1. This includes "membership" in technology transfer programs with Universities, the National Laboratory System, and Government funded research.

2. This includes financial contributions to Universities, (for example, technology programs, funded research, stipends, etc.)

As a note in passing, these items are what created the industrial complex we call Silicon Valley. (Re: Vannevar Bush, Frederick Terman, et al.)

Making the strategy work for you:

You should, also, consider yourself a "technology operator."

This means that:

1. In every organization or project, there is a few that "make things happen." They are the "consensus makers," or "operators." This is the path to promotion, and financial responsibility. These people instinctively know that being right doesn't mean anything.

2. In decentralized management, being a "team player" and instinctively working toward higher level objectives in pursuit of win-win scenarios is the key strategic concept to being an "operator."

Foil 10, cont: "Technology operator:"

It also means that:

1. You should develop your concepts of "thinking strategically." (Engineering thinking is largely tactical.) Always look to "higher level objectives" in your decision making process.

2. You should cultivate your capability of "inductive reasoning." (Engineering reasoning is largely deductive.) Always be aware of the interaction of the sum of the parts of a system, (be it a management or administrative system, etc.) In such systems, the whole is larger than the sum of the parts-and you had better be in control of it, and that means focus your attention on the whole, and not the parts.

Foil 10, cont: "Technology operator:"

Additionally it means that you will have to diversify your skill set:

1. Financial capability, (not accounting, **financial**, like in being able to read a profit and loss balance sheet, or a general ledger, and know what it means,) should be developed at an early stage in your career.

2. You should stay "in tune," with the changing "landscape" of management and organizational concepts. (The Management by Objective, (MBO) that was taught in business schools a decade ago doesn't work very well in fast paced, global markets.)

3. Stay in tune with computational science. Learn how to use it to "manage by wire," and "electronically mediate" your work.

What's next in your career after this?

There will come a time when, one way or another, you will be assuming responsibility for the actions of others, possibly by:

1. Becoming entrepreneurial, and starting your own enterprise.
2. By moving into the executive suite.

Either way, you will have had to master what has been outlined here, (particularly in foils 10, and 11.)

In addition, you will have to:

1. Understand the difference between supervising, and managing people.
2. Learn how to manage the actions of others through policy.

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