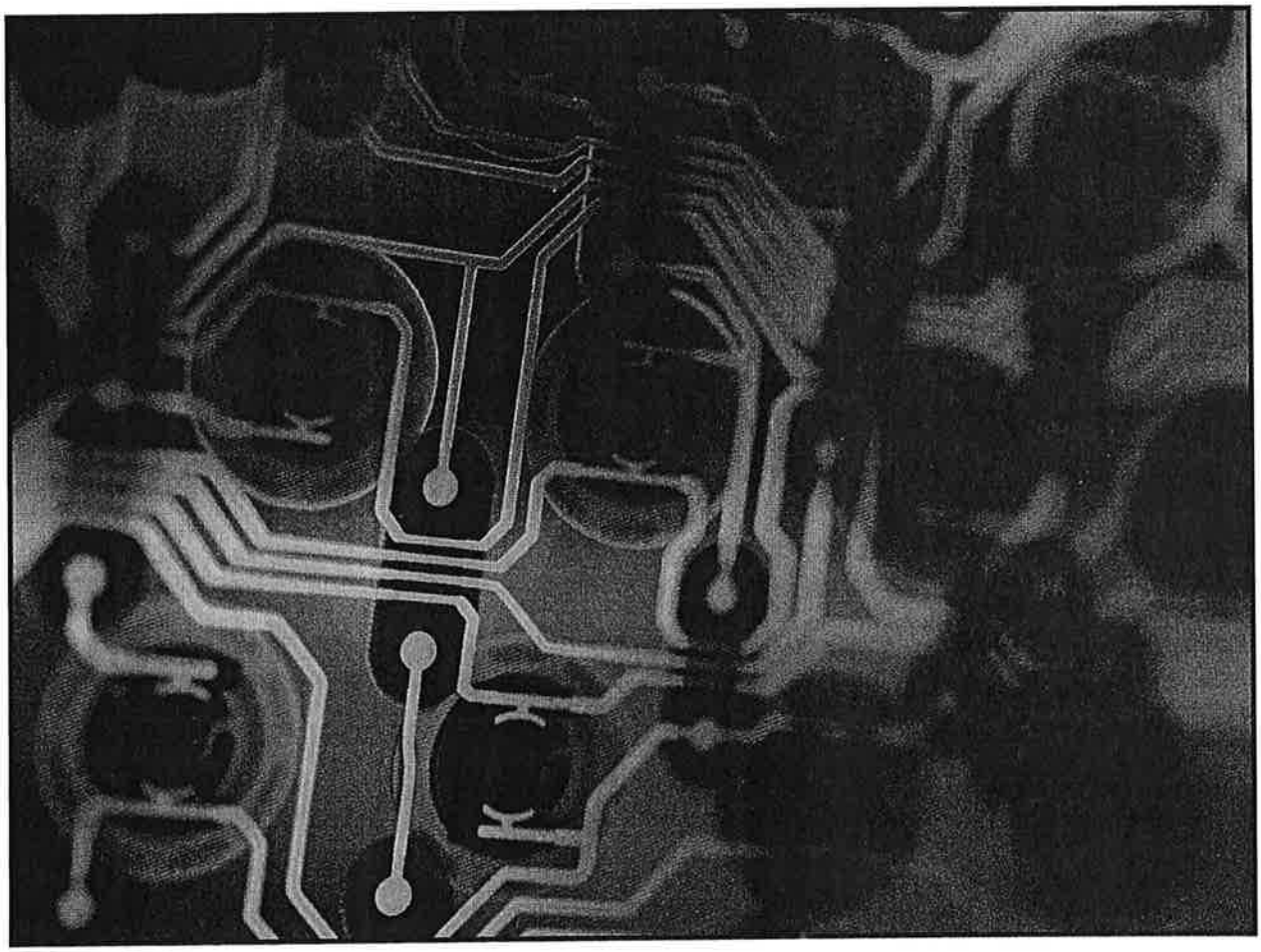
PREMIER REFERENCE SOURCE

Selected Readings on Information Technology Management

Contemporary Issues



George Kelley

Selected Readings on Information Technology Management:
Contemporary Issues

George Kelley
University of Massachusetts, Boston, USA

Information Science REFERENCE

INFORMATION SCIENCE REFERENCE
Hershey · New York

Director of Editorial Content: Kristin Klinger
Managing Development Editor: Kristin M. Roth
Senior Managing Editor: Jennifer Neidig
Managing Editor: Jamie Snavely
Assistant Managing Editor: Carole Coulson
Typesetter: Lindsay Bergman
Cover Design: Lisa Tosheff
Printed at: Yurchak Printing Inc.

Published in the United States of America by
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue, Suite 200
Hershey PA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

and in the United Kingdom by
Information Science Reference (an imprint of IGI Global)
3 Henrietta Street
Covent Garden
London WC2E 8LU
Tel: 44 20 7240 0856
Fax: 44 20 7379 0609
Web site: http://www.eurospanbookstore.com

Library of Congress Cataloging-in-Publication Data

Selected readings on information technology management : contemporary issues / George Kelley, editor.

p. cm.

Summary: "This book presents quality articles focused on key issues concerning the management and utilization of information technology"--Provided by publisher.

Includes bibliographical references and index.

ISBN 978-1-60566-092-9 (hbk.) -- ISBN 978-1-60566-093-6 (ebook)

1. Information technology--Management. 2. Information resources management. I. Kelley, George, 1960-

HD30.2.S4545 2008

658.4'038--dc22

2008019460

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

Table of Contents

Section II
Development and Design Methodologies

Section III
Tools and Technologies

Prologue

Sholie iwanded the door open and settled in with eager anticipation. Her iwand celebrated her on time arrival with a reassuring two-tone chime. The immersion displays around her told the story. Dubai in 2030 had much professional appeal to a promising 22 year old. "As if."

The audio receiver behind her left ear chirped a question. Something about googling. The iwand autosynched in beat with the question. The answer came in real time. Sholie's eyes rolled in dismay. "As if."

Sholie learned from her iwand that googling was something you once did with 'keywords'. "Once popular with parents" the iwand added helpfully. Not that Sholie could fathom why from the rest of the explanation. "Old technology" the iwand continued, "built around (*q.v., arch.*) 'SQL database lookups'."

The iwand's ergometric sensors registered Sholie's frustration. And switched to speech, mock derisive: "Googling was a way to generate lists of links ... neatly ordered like a bowl of spaghetti!"

Oh, Sholie laughs enlightened. Like in early versions of my iwand. The ones with the dial-up voice channel and that annoying click-based browser. Nothing like the "I-want" universal remote immediacy of her iwand. "Enough!" she decides.

As the door swooshed shut behind her, Sholie's iwand came to life with an insistent color pattern. Her friends in Lagos and Melbourne wanted to know if she would join them at a virtual party in Cancun. Her eyes lit up too. "As if."

TOOLS OF THE DAY

Every generation is defined by the characteristic tool of its day. From the plow to the loom to the computer took centuries. Computers to iwands, only a few decades. Sholie was born today, the very moment you picked up this book. What part will you play that fateful day in her life in 2030?

Electrification, telephony, radio and TV were all important contributions of the 20th century. So were the motherboard and the CPU, the computer keyboard and the mouse, disk drives and CRT displays, routers and network adapters. They prepared the infrastructure of which you as an IT professional are now the steward.

You must now act to use and expand the Internet to its full potential. Soon every person on the planet will become heavily dependent on your insights, skills and decisions as an IT professional. Your personal contribution as an IT professional will be one of high impact, and so also one of high responsibility. Sure the wheel that gets the credit will be IT. But the axle that will do the real work will be you.

This book addresses some of the important issues you will be asked to act on in the next several years to help make information technology management a better steward of electronic assets and user experiences of the knowledge society.

Spear to plough, potter's wheel to compass, loom to lathe, every new tool of the day defined an age for all centuries to come.

For the knowledge society, the tool of the day is the Internet.

And someone has to manage it, change it, and improve on it.

That someone is you.

YOUR POST-GOOGLE WORLD

You may have heard of a company called Google. Soon out of business. Obsolete. Laughably so. Why?

The first 30 years of the Internet were about porting our physical reality to the electronic world. For example the nytimes.com Web site anachronistically advertises subscriptions to the "real paper," just like it looks in print. PDF documents were created to overcome the limitations of HTML to render business forms "just like they looked on print." University research databases output pdf's "just like they looked in the printed version of the journal." And Google took the key-oriented SQL database index thinking of the 1970s and applied it to word content intended to be displayed by HTML in a browser. Key-words, get it?

You will soon see Google's approach to be a primitive. Manual keyword injection to pull content off the web. A re-invention of the nickel newsreel and Sears catalog, more than one hundred years after their original introduction. And a fundamentally mal-adapted way of interacting with the Internet you will soon be managing as an IT professional. Because SQL keys are storage and record oriented, and words are about things and facts. Closed physical systems. When the Internet 2.0 is flow- and time- oriented, and about people and events. Open cyber systems.

Internet 1.0 was like watching a traffic light: predictable, repetitive, and boring (Wolfram, 2008).

People first marveled at the click-link connectivity of 1.0. You knocked, and was let in. Oh, the ability to read the newspaper without traipsing to their own porch. Send a letter without the need for a stamp. Steal some mp3's. Drag shopping carts down electronic aisles. Watch some video. Just knock. On doors. Links. And ads.

Internet 2.0 however is much more. Much more. Exciting. New. Very new. It's about participation, sharing, contact and discovery.

In 2.0, you don't knock on doors for permission to enter. You live there. Everywhere actually. All the time. With your many yous.

In 2.0, you can bring your own shopping cart, and leave with your own shopping cart after check-out.

In 2.0, like the Wizard's Apprentice, you can have multiple shopping carts trolling for you. All 10 or 20 or 150 of you. But there will be no Google urchin watching you.

Because you won't be online.

We'll explain in a bit.

IT SPEED BUMPS

Your transition to 2.0 in the next several years will run into two little speed bumps. Friendly but for their ugly names, IPv6 and Y2K38.

Much to the delight of hourly IT consultants worldwide, there will be a forced transition from IPv4 to IPv6 sometime around 2015. The changeover is not to support streaming media or bandwidth bottlenecks. Earlier QoS concerns about IPv4 packet latency and jitter have been allayed by backend optimization, lighting dark fiber, and improvements in last mile connectivity.

Between 2010 and 2015, IANA will have run out of unused IPv4 addresses to dole out. The use of NAT and CIDR with IPv4 has delayed but not eliminated the problem of IPv4 address space exhaustion. So the exhaustion of the address space will be the real driver for the introduction of IPv6.

In anticipation of the IPv6 changeover, early in 2008 IANA added IPv6 support to about half of the Internet root name servers. But relax. Automated transition mechanisms based on proxy servers and tunneling will ensure that the overlay of IPv6 will be transparent to the current IPv4 Internet (Hallam-Baker, 2008, pp. 325-326). And IPv4 won't be phased out anywhere near before your retirement. Or that of your grandchildren.

The speed bump that will jostle you a bit is whether it will be necessary or politic to enable the flow QoS field in the IPv6 data packet. The flow field was intended to enable priority routing of different classes of traffic, for example real-time multimedia, asynchronous requests, provisioning or storage replication traffic, and paid traffic. The use of the field for traffic shaping is controversial because its benefit comes at the expense of 'net neutrality. Should the rich ride on better roads than the poor? You decide. At the moment, the flow field is part of the IPv6 data packet, but remains unused.

Next to the IPv6 overlay, another area of discussion for the IT community in coming years will be Y2K38. Son of Sam. Heir to Y2K. The earlier bug caused by the use of 2-digit years instead of 4-digit years in software doing date computations. Y2K38 comes from the use of a 32 bit signed integer to tick off seconds since the arbitrary birth of computer time, Thursday January 1 1970 00:00:00 GMT. The largest possible value for this integer is 2**31 - 1 = 2,147,483,647 seconds (Y2K38, n.d.).

Oops. On Tuesday, January 19, 2038 03:14:07 GMT the clocks of unpatched 32 bit platforms will tick:

```
Tue Jan 19 03:14:06 2038  OK
Tue Jan 19 03:14:07 2038  OK
Fri Dec 13 20:45:52 1901  !?
Fri Dec 13 20:45:52 1901  !?
```

Y2K38! About 80% of today's Web servers worldwide run on computers that have Y2K38 problems.

Fear not. Y2K38 doomsday scenarios won't happen. But they won't be entirely pre-empted even with the full replacement of the current worldwide stock of 32 bit PCs and embedded processors with 64 bit versions.

Even if little of today's hardware survives to Y2K38, and despite every IT consultant's lucrative efforts at preemptive remediation in the years to come, there will almost certainly still be some of today's unpatched software programs designed for 32 bit OSs running in 2038.

If (and a big if it is) the original source code is still available, such software programs can be fixed by recompiling. With new timestamp libraries which use 64 bit (long long integer) values for tick time.

A good number of today's databases may well survive until 2038. Nearly all use dates in some form, and so will need Y2K38 sanity review. And of course. Billable IT work.

What about the tens of millions of what are today's new portable devices? The smartphones with Web-enabled capabilities which will find their way to poor corners of the world. Mumbai junket anyone? Else, how will these recycled devices be upgraded?

In earnest though. The actuarial drumbeat call for pre-emptive Y2K38 IT remediation, and corporate officer personnel, and general public education in businesses has already sounded. And it will only grow louder and more insistent the next several years.

After January 19, 2008, for example, IT professionals at business organizations who have to process 30 year home mortgages, trade in 30-year Treasury Bonds, track pension or Social Security years of service, or purchase EE/E Savings Bonds, will already begin answering Y2K38 questions.

And so will you. That's your other speedbump.

Security

IPSec, PKI, SSL, and RSA under FCAPS, TMN and ITIL will all be part of your alphabet soup security diet for years to come (Parker, 2005). So will the CIA.

No, not the spooks. We mean the foundational "CIA" tripod concepts of Confidentiality, Integrity, and Assurance (Thomas, Seiferth, & Kelley, 2004). How so? Let's see.

Confidentiality

In the area of confidentiality, you have your work cut out for you. The technologies exist. Yet there are no IT infrastructures in place, or even user-based software, which paint true the secondary colors of Confidentiality (Thomas, Seiferth, & Kelley, 2004):

- **Privacy:** The right not to have disclose what you know about yourself;
- **Quietude:** The right not to be disturbed by outside intrusions when engaged in your activities); and
- **Transparency:** The right to keep your level of activity, or your lack of activity, and contact points invisible to outsiders.

Don't forget. 2.0 is about flow and time, people and events. So new thinking is needed in these areas which emphasizes the right of individuals to retain lifetime control over the use and disclosure of their confidential information.

The current thinking is based on the business record model. It holds that confidential information once included in an organization's database becomes that organization's business record, i.e., property. And as such subject to few and feeble legal constraints. Often just the use and disclosure policies of the business. Themselves shaped by the fiduciary duty of the officers of the organization to use its assets in the manner most advantageous to the business owners.

Read: shaped to the disadvantage of the individual who really owns it.

Alarms have sounded (Hartzband & Groopman, 2008). Heed them. Consider for example "health insurance." In quotes yes. Because the business of health insurance is both immoral and economically unsound. Health insurance is legislated murder. Health is not a good subject to pricing considerations based on the elasticity of supply and demand. Risk management and cost containment in health care must be managed by behavior modification and education. Not financial gerrymandering. Prevent now not to have to cure later. Reward medical outcomes, not procedures. Impose access to care, not barriers (Whittaker, Adkins, Phillips, et al., 2004). Health is an atomic good. Indivisible is health from the human condition. It needs to be treated as a right, like the air you breathe (UN, 1948). Not as a privilege, as is currently the case for the poor in the U.S. and worldwide.

IT plays an enormous role in health care in the United States. You will see for yourself. Repeatedly as your career in IT progresses. As the Baby Boom generation ages, your will find your career in IT time and again ensnared in health care issues. Because laws like HIPAA, SOX, FACTA/FCRA, ERISA and the GLBA have all failed to address the conceptually flawed business-record-oriented storage view of personal information. And of health information in particular. Various DNA protection laws have also stalled in legislative committees.

When in the U.S., your access to care is subject to employer-based or government-based enrollment pools. And constrained by coverage exclusions for so-called "pre-existing conditions."

Now then. Pre-existing conditions are an artificially created coverage exclusion concept. They arise from fractured procedural enrollment and dis-enrollment processes. Book-keeping entries. For example when moving or changing employers. Pre-existing conditions are a legal concoction which criminalizes being sick. They doom many a patient to death for lack of treatment (Nolte & McKee, 2004). When pre-existing conditions do not exist in the physical world.

Life is a pre-existing physical condition. A covered enrollment pool isn't. Hence the problem.

To fix, start by making "pre-existing condition" discrimination illegal. Then you come in. To implement content rights management (CRM). To provide a means in IT to make available cradle-to-grave, and intergenerational datavault services. Personal database access services tied to permission access tokens. Under CRM, the decryption key is only released when specific release constraints satisfactory to the owner of the data are met (Hallam-Baker, 2008).

In such databases, the access token is the only information stored in the third-party business database. The token limits access to a number of accesses within a certain period of time. And only for specific reasons. It also forbids forwarding of the token to third parties, and certainly storage and replication of the read content.

The token issuer retains the right to revoke the token later. With the use of the token, there is no copying of the personal medical information in a business database. So there is no un-necessary duplication of data. Access to data is improved, and errors are reduced. Privacy is preserved. Lifetime. Across generations.

And, importantly, private medical data never becomes a corporate business record.

Ever.

You need to act. The "health insurance" example shows new models of token-friendly and non-business record database storage are urgently needed in IT. Heed the warnings (Hartzband & Groopman, 2008). No satisfactory solutions exist today. You will have to discover and implement them.

Remember. The current SQL approach to databases took form in the early 1970s. It has not been meaningfully updated in nearly forty years now. It tripped up Google.

But not you. You know SQL is a storage-oriented model. Today woefully inadequate to support data not intended to be stored under the business record model.

Medical records are not the only issue. SQL does not adequately support or index multimedia and streaming data, timed-lifetime and time-to-live token based access, role-constrained access, access under digital rights management, or even access of data stored in encrypted form. Let alone access tokens candy-wrapped with CRM instructions.

Do better. Please!

Integrity

Integrity is the property of data which specifies it has not been altered away from its intended value. There are three secondary colors subsumed under the integrity rainbow (Thomas, Seiferth, & Kelley, 2004):

- **Authentication:** You credentials are solid;
- **Authorization:** You were privileged to do it; and
- **Non-Repudiation:** You can't deny it was you who did it.

Much work has been done in IT towards the attainment of data integrity in the secondary colors of authentication and authorization.

In the case of authentication, examples are the development of SQL (for the integrity of business records), the use of VPN-based end-to-end traffic encapsulation and encryption, the widespread use of two-factor authentication (the familiar combination of a credit card magnetic stripe and a pin), and the near-universal adoption of PKI (public/private-key infrastructure) for third-party Web server authentication and traffic encryption.

A needy area of research in IT is how to authenticate the rapidly growing number of small hand-held wireless devices (Corbett, 2008). That's where you come in. For example, it should not be necessary to replace a SIM chip on a cellphone when of intercontinental travel. Fix it!

In the case of authorization, adequate IT mechanisms exist, for example Role-Based Access Control, the Principles of Need To Know, Defense-In-Depth, and Separation of Duties, and the concepts of No-Write-Down and No-Read-Up (Solomon & Chapple, 2005).

However softwares to easily implement them are only realistically attractive to large organizations. New hosted models are needed with pre-implemented software which makes Authorization more attractive and affordable to smaller businesses. Create them!

The weakest link is non-repudiation. Spam e-mail provides daily examples in your mailbox. A new SMTP protocol with encryption and non-repudiation built-in is needed. Patch approaches based on Personal security certificates have been unsuccessful. PGP failed as a company. The need for improved Non-Repudiation will increase as the rapidly growing number of smaller devices provide multiple access points opportunities for the same individual (cell phones, laptops, business computers, PDAs). Don't dally. Invent it now.

Assurance

Assurance addresses the issue of being able to access your data when you want. Assurance has three components (Thomas, Seiferth, & Kelley, 2004):

- **Availability:** It's up-time and running when you need it,
- **Reliability:** It functions as intended, without surprises; and
- **Serviceability:** It performs a meaningful function, meets its purpose well.

Availability and reliability are currently generally satisfactory. If only because of their marked reliance on the wasteful concept of redundancy. Redundancy is achieved for example from a second power supply; RAID hard-disk sharing technologies; fewer moving components, say from the elimination of fans and the introduction of disk-less hard-drives; automated failovers to an alternate site when of flood and fire; the increased reliance by small companies on hosted services, with stronger house expertise and infrastructures, and the self-rerouting capabilities of the Internet. But let these be. Hardware is cheap really. And other issues in IT are more urgent.

Serviceability is the component of assurance in the greatest need of additional IT development. Here you will be busy. Single sign on for example is still notoriously difficult to implement and maintain, dooming us to having to remember multiple passwords for every Web site we visit. Personal-level PKI

security certificates, for example PGP for personal e-mail and blogs, failed to gain acceptance because too difficult to use and maintain at the retail level. The result is most personal e-mail is sent unencrypted, the sender retains no control over forwarding rights, and the Internet arteries are clogged with spam e-mail. And serviceable personal datavaults don't exist. That content ends up in business records. But you already promised to fix that, right?

Flaws in serviceability flow already from basic IT architectural design flaws. The most glaring are the many and increasingly inexcusable software bugs. But the issue of software bugs is of course not specific to security. Software development in IT still has much to learn from the construction engineering disciplines. Examples are the need to learn to rely on proper software equivalents of (a) architectural blueprints (itemized bills of materials, and detailed plan-, section-, and elevation-views, all drawn to scale); (b) purpose-built sub-component modules (like windows and doors); (c) conformance to a standardized software building code (akin to the ICC); (d) the definition of a proper IT professional corps body of knowledge and the establishment of a related Duty-Of-Care professional standard; and (e) adequate professional software contractor licensing laws (no different from engineers, attorneys, physicians and nurses, accountants, electricians, plumbers, and barbers). Grab a hard-hat and talk to a licensed engineer. They'll explain.

IT Outsourcing and Offshoring

IT outsourcing is the practice of farming out work that is not a core competency of an organization to a specialist for whom it is. IT offshoring is the specialized variation of outsourcing in which the IT work is farmed out to a specialist organization in a country in which the organization does not otherwise normally do business. Outsourcing is done primarily to improve organizational effectiveness, and offshoring is to reduce costs.

In the U.S. there has been public concern that offshoring exports desirable IT jobs. Given the shortage of IT talent in the U.S., and in most every other country worldwide, this argument does not have merit. No local resource is left idle but for lack of foresight and planning in the education of the high-skill workers sought by today's employers:

Every big employer in the city, it seems, can cite an example of high-paying jobs that had to be relocated to foreign cities [...] Until now, visa restrictions have been seen as a problem that primarily affected technology companies in Silicon Valley and elsewhere in the West. [...] But [...] there is more demand for visas for specialized jobs in New York, New Jersey and Connecticut than in California, and most of the demand comes from small and midsize companies, not the largest corporations. [...] The partnership recommended adjusting the cap on H-1B visas to meet demand and more than doubling the annual limit on employment-based green cards to 290,000 from 140,000. It also suggested exempting workers with advanced degrees in science and math from any cap on H-1B visas and extending the term of visas for workers receiving practical training to 29 months from 12 months. (Mcgeehan & Bernstein, 2008)

Offshoring has always existed. Be it copper, bananas, automobiles, or digital software projects, commodity products always go to the high volume, low cost producers. Let them have them! What many fail to see is that offshoring and outsourcing free up local resources for higher-level functions like:

- Specifications gathering
- Solution design and architecture
- Vendor selection and coordination

- Scheduling and deadline management
- Marshaling and resource allocation
- Digital warehousing and distribution
- Electronic marketing and brand building
- Multi-modal financing and payments clearing
- Electronic branding and trust building
- Multipresence electronic customer support

Why be a bricklayer when you can be an engineer? A bookkeeper when you can be a controller? Or a software programmer when you can be a software architect? Isn't that why you picked IT as a profession? Do good, get paid more, serve others as you move up in life?

By 2030 there will be over 8 billion people on the planet, about half under the age of 25. A billion more by 2050, many in poverty. The need to plan and implement the IT infrastructure needed to support the electronic needs of these new populations exists already today (Corbett, 2008). These population growth pressures will compete with the rocket effect of IT wealth creation: the rich have robopets when the poor lack shoes (Normile, 2008).

In the U.S., the collapse of the economies in say Michigan, Ohio and Pennsylvania was not caused by offshoring of IT jobs to India or manufacturing jobs to China. It was caused by a lack of vision and a grossly short-sighted planning horizon. The failure to educate the young quickly enough as they came out of grade school in the 1970s so as to raise blue-collar job expectations from assembly workers and food servers to high-level and high-paying MBA-level career expectations in product and process design, project management, engineering, and enterprise management.

As IT virtualizes society, there will be a need for highly skilled IT engineers, technical MBAs, and science and technology PhDs by the millions to manage increasingly abstract and variegated projects. Today's tragedy in Ohio, Michigan, and Pennsylvania is that millions for decades have instead dropped out of high-school (Dillon, 2008). Minds abandoned for life.

While local talent works low-paying jobs at the mall or goes to prison, about 30% of the students enrolled in graduate STEM (science, technology, engineering, and mathematics) programs in the U.S. hold foreign student visas, virtually all on paid appointments and free-ride scholarships (NSF, 2008).

Then upon graduation, these students obtain automatic residence and work permits to meet the clamor of employers for their skills and talents (Mcgeehan and Bernstein, 2008). At a time when U.S. employers demand doubling the annual limit on highly-skilled worker visas to 290,000, 32% of black males in the U.S. drop out of school and end up in prison at some point in their lives (Mcgeehan and Bernstein, 2008; USDOJ, 2007).

To adequately support the knowledge society of the 21st century, executive MBA and STEM disciplines today should be enrolling ten times more students than is currently the case. For example, China today has maybe 5,000 MBAs when it will need some 75,000 by 2020 (Lavelle & Rutldege, 2006). Yet even though the MBA degree was invented in the U.S. to combat a dearth of mid-career management depth, it was not the U.S. but tiny Dubai and Qatar which has had the vision to build entire new cities from scratch to house dozens of new university campuses to train the world's leadership of tomorrow (Lewin, 2008).

Shortages of vision seed many of the tragedies of life. But you can help. As an IT professional, you're in the right place, at the right time. Every technological revolution was constrained by a shortage of higher-skilled talent, not a lack of lower-skilled labor: agricultural irrigation and crop rotation; steam mechanization; industrial scale mining, chemicals and refining; power generation and electrification; telecommunications (radio, TV, telephony); and now IT and digitalization.

Entire lines of new Electronic Project Manager professions in IT are needed to provide the people and technology implementation and coordination skills needed to support these new functions. It's unconscionable factories are being emptied of blue collar workers while so many attractive Web mechanic and virtual society architect jobs go unfilled.

The reality is there are not enough people in the collegiate pipeline being trained with the undergraduate technical skills needed to support these Web mechanic functions once implemented. And the education needed to function in the design and management of these new jobs is tragically also not well covered by existing graduate-level MBA or engineering degrees. The situation is sufficiently alarming to warrant the creation of a graduate school GI Bill to make it possible to recruit and train IT professionals in sufficient numbers. In the meantime, yes you can help. Mentor.

IT and Electronic Collaboration

Much in the news is the notion of an IT convergence. Meaning the merging of any number of once separate devices into a single one: remote controls and cell phones, TV and radio, laptops and computers, printers and scanners.

The exciting part about convergence is not convenience. It is the ability to participate. While being selective about the mode and timing of your participation, and the size of you audience.

TV and radio, libraries and art museums, movies and theater, newsprint and newscasts, Web pages and blogs. All were essentially observational opportunities. You watched. Sometimes by appointment. Sometimes at your convenience. Content was broadcast. You did not participate.

Under pincasting, you do. Your thoughts and actions count (Story, 2008). What you are contributes (Hanell, 2007). Your voice is heard (Stone, 2008). Work collaboratively towards a goal (Stelter, 2008). Share ideas, successes, and failures (Goetz, 2008). From any device of your choice. Always at your convenience. Just about everywhere you visit.

When you flip the crate to use it as your dais, your browser is no longer a container. It is a world stage (Jackson, Gharavi, & Klobas, 2006). That's quite a step up from the day in 1872 when an Act of Parliament set aside an end of London's Hyde Park as the Speaker's Corner.

Some forms of pincasting are already familiar to you. When you e-mail, chat online, or send an SMS text message, your dispatch speaks for you when delivered. But pincasting also includes listing your resume on Monster. Posting classified ads on Craigslist. Bidding on eBay. Annotating Yahoo maps. Entering a trouble ticket online with your cable provider. Adding your personal ratings and recommendations to your Amazon purchases. Sharing photos on Flickr. Uploading movies to YouTube. Adding your comments to blogs. Bookmarking newsclips with Digg. Requesting money with Paypal. Chirping your friends on Facebook. And editing articles collaboratively with strangers on Wikipedia (Stvilia, Twidale, Smith et al., 2008).

Social networking is the flipside of pincasting. Under pincasting, you hop from site to site to participate. You take your clicks with you. And you have to know where to visit.

With social networking, you participate from the same place. And the clicks come to you. Examples are MySpace and Facebook.

The combination of pincasting and social networking will transform our understanding and experience with computers. "Compare a modern PC of 2004 to the first Macintosh shipping in 1984 and the major difference you will see is color." (Web 2.0, n.d.)

No longer. You will change this. You know computers are no longer single-user, keyboard, touchscreen, and mouse-driven closed systems anymore. And that content is not limited to disk files and Web pages. You see computers are now gateways open to interaction with any number of immersive metaverses.

External digital worlds in which avatars interact as proxies for humans. To establish a virtual presence for collaboration. Or accomplish an individual goal. But without physical limitations.

For example, teleportation of self between islands, rooms and minihompies is a natural part of Second Life, Habbo Hotel and Cyworld. And with a strong sense of execution time and sustained identity. Every message intended for delivery to an island object specifies the time at which it is to be executed. "These messages are literally the island clock." (Croquet, n.d.) And Second Life, Habbo Hotel, and Cyworld self-entities all know how to display themselves and respond to events, and communicate outcomes back to the exosphere.

Islands, hotels, and cyworlds are metaverses. A complicated word for electronic playgrounds. Metaverses like Second Life, Habbo Hotel, and Cyworld have characteristics not available to closed systems PCs:

1. **Persistence:** Every act of speech (message) alters the state of the metaverse, and so imprints it for all posterity;
2. **Receptivity:** State changes are welcomed at any time and can be executed asynchronously;
3. **Independence:** Message execution is not tethered to the presence of the controlling exosphere;
4. **Sociability:** Because speech acts are journaled and identity defined by text properties, it is easy to find like-minded objects by property search and discovery by reflection;
5. **Pervasiveness:** The metaverse accommodates all users in all spaces all the time;
6. **Adaptability:** Changes and updates can be made to serve new uses;
7. **Permanence:** Updates can be applied without disruption, while the system is live and running;
8. **Synchronicity:** All elements are aware of the same clock;
9. **Schedulability:** Event deadlines exist and are met or diverted;
10. **Dressability:** The views presented can be shaped by individual preferences and folksonomies (collaborative tagging);
11. **Extensibility:** New objects and functionality can be added to support new content and sources; and
12. **Shareability:** Content and functionality can be shared with other metaverses without exosphere mediation.

    (Adapted from Boyd, 2008; Crocket, n.d.; Web 2.0, n.d.)

Not yet available that is. You will add them. Why? Need. And the bane of IT. Change.

VIRTUAL SOCIETIES: THE DEMISE OF THE BROWSER

Pincasting and social networking the creation of an entirely new class of online communities: virtual societies.

It is here in the building of the infrastructure needed to support these new virtual societies that your skills as an IT professional will be most needed.

The scope of work is enormous. The vision needed is that of Peter The Great and Eleanor Roosevelt combined.

India and China combined for all their size still can't put together enough IT personnel to support their own growth, let alone virtualize global trade, support persistent electronic cities, and digitalize reality on the scale to come in the next twenty and forty years as virtual societies aggregate and take shape online.

Blogospheres, wikis and similar Content 2.0 Web sites, and common interest Web sites like LinkedIn, Facebook, eBay, Skype, World of Warcraft, Blackboard, SecondLife and Yahoo annotated maps, these are all examples of early form virtual societies. They are the beginning of something big. Very big.

They all establish persistent virtual presences for their inhabitants, all of whom share a common interest and change state as they live online.

What they have in common is that the share the common interests and goals, and they allow you to maintain a telepresence by means of electronic avatars listening in and cataloging events for you, and acting on threshold and timed trigger commands on your behalf.

You exist. Online. Even when you're not logged in.

You live by multiple clocks, all ticking in their own worlds, awaiting events and triggering actions based on mandates and contingency instructions you have provided.

Physical distance? Vanished. And with that location. You can be two and more places at the same time. Your avatars will speak and listen and act on your behalf. Electronic mini-me goblins watching and acting on your interests everywhere.

You can and do become an inhabitant of multiple virtual societies. Each new individual avatar presence you add helps multiply the worlds' population of Internet users. And because the actions and interactions of your avatars are traceable and rewindable, the diffusion of self into virtual worlds they represent promises to eventually challenge our current ontological understanding of time evolution and consciousness (Jenkins, 2006). You will experience multiple "immersion digital lives." Yes. All 10 or 20 or 150 of you.

You will enjoy multiple sets of experiences on the Internet 2.0. Truly rich. No need to live within a single bubble realm of experience. You will be free to act and choose, in a vast existential virtual playground. One which would please Heidegger and Sartre to no end. Your personal, work, family, and community participation will be real, and simultaneously virtual. For example, soon individual consumers with common needs and preferences will come together. To communicate with each other, and upon reaching a consensus collectively negotiate their market with prospective sellers before disbanding again (Chena, Jeng, Leea, et al., 2008). To share their hopes and tears (Goetz, 2008). Yes. Soon, you won't just watch a movie or ball game. You will act or play in it. Or at least one of your avatars will.

The next 20 years of the Internet will be about the establishment of virtual societies. The scale of electronic sharing and collaboration virtual societies will enable will be staggering. And the transformative role of IT research and the impact of your work as an IT professional immense too. Just think. Internet traffic has been doubling every five years. The same amount of IT work that was done building Internet 1.0 Web sites between 1995 and 2005 will be needed in a geometric multiple as Sholie comes of age.

A glance at the techno-needs imposed by the current digital revolution in IT reveals the urgent need for IT technologies to design, implement, and support advanced and highly abstracted processes:

- Multi-point electronic asset distribution under federated regimes;
- Orchestration, and choreography of events into processes;
- Global electronic timing, coordination, and virtual event scheduling;
- Support for digital neighborhoods, which group by asset, interest and skill instead of physical location;
- Ordinary plumbing services for entire electronic cities populated by multi-presence avatars;
- Distributed mesh computing for resource discovery, marshalling, task allocation, and supply chain assembly;
- Real-time multimedia search, real-time asset tracking, and real-time statistical projections and electronic mining

Every single of the interactions and transactions just listed will have to be enabled secured in some layered fashion by new families of security protocols, inter-venue cooperation agreements, competing target-specific products and services, and of course the people with the high-level know-how, experience, and talent in IT to design, implement and manage them. Where are these bodies? These brains? Without them, how are you ever going to retire?

The primary means of interaction with the Internet will be avatars. Your proxies. Controlled from observation, command, and control centers. The exosphere. Content will not be generated for HTML presentation. It will be generated for API delivery. With tools like Coghead, Project Zero, QEDWiki, the WSO2 Mashup Server, and their descendents. For rendering in gateways to virtual worlds with built-in collaborative capabilities: mashups (Boss & Krauss, 2007; Yee, 2008).

For an early peek, look at Vuze, LinkedIn, Second Life, Habbo, and Cyworld.

Then flip through this book.

By the time you're done reading it, you'll want to help.

And by the time you're done helping, there will be many of you.

But there will be no clicking. No knocking on doors. No need for a browser. Or Google.

George Kelley
June 2008
Boston, MA

REFERENCES

Boss, S. & Krauss, J. (2007, August). Power of the Mashup: Combining Essential Learning with New Technology Tools. *Learning & Leading with Technology*, 35(1), pp. 12-17.

Boyd, D. (2008). Why Youth Love Social Network Sites: The Role of Networked Publics In Teenage Social Life. In *Youth, Identity, and Digital Media,* D. Buckingham (ed.). The John D. and Catherine T. MacArthur Foundation Series on Digital Media and Learning. Cambridge, MA: The MIT Press, 2008, pp. 119-142, doi: 10.1162/dmal.9780262524834.119.

Chena, D.-N. Jeng, B., Leea, W.-P., & Chuang, C.-H. (2008). An Agent-Based Model For Consumer-to-Business Electronic Commerce. *Expert Systems With Applications*, 34(1), 469-481.

Corbett, S. (2008, April 13). Can the Cellphone Help End Global Poverty? Selling To The Other Three Billion. *The New York Times*.

Croquet (n.d.). See http://www.opencroquet.org/index.php/System_Overview

Dillon, S. (2008, March 20). States' Data Obscure How Few Finish High School. *The New York Times*.

Goetz, T. (2008, March 23). Practicing Patients: Patients Like Me. *The New York Times*.

Hallam-Baker, P. (2008). *The DotCom Manifesto: How To Stop Internet Crime*. Reading, MA: Addison-Wesley.

Hanell, S. (2007, November 13). Inbox 2.0: Yahoo and Google to Turn E-Mail Into a Social Network. *The New York Times*.

Hartzband, P., & Groopman, J. (2008). Off the Record — Avoiding the Pitfalls of Going Electronic. *The New England Journal Of Medicine*, 358(16), 1656-1658.

Jackson, P., Gharavi, H., & Klobas, J. (2006). Technologies of the Self: Virtual Work and the Inner Panopticon. *Information Technology & People*, 19(3), 219-243.

Jenkins, P. S. (2006). Historical Simulations: Motivational, Ethical and Legal Issues. *Journal of Futures Studies*, 11(1), 23-42.

Lavelle, L., & Rutledge, S. (2006, January 9). *China's B-School Boom*. Business Week.

Lewin, T. (2008, February 10). Global Classrooms: U.S. Universities Rush to Set Up Outposts Abroad. *The New York Times*.

Mcgeehan, P., & Nina Bernstein, N. (2008, March 24). Businesses Say New York's Clout Is Emigrating, With Visa Policies to Blame. *The New York Times.*

Nolte, E. & McKee, M. (2004). Measuring The Health of Nations: Analysis Of Mortality Amenable To Health Care. *Journal of Epidemiology and Community Health*, 58, p. 326.

Normile, D. (2008, March 9). Trumpets vs. Crumpets In A Robot Duel. *The New York Times*.

NSF (2008, January 28). Foreign Science and Engineering Graduate Students Returning to U.S. Colleges," Division of Science Resources Statistics, National Science Foundation. Available online at http://www.nsf.gov/statistics/infbrief/nsf08302/

Parker, J. (2005). *FCAPS, TMN & ITIL. Three Key Ingredients to Effective IT Management*. OpenWater Solutions. Available online at http://www.openwatersolutions.com/docs/FCAPS_TMN_%20ITIL.pdf

Solomon, M. G., & Chapple, M. (2005). *Information Security Illuminated*. Sudbury, MA: Jones and Bartlett Publishers.

Stelter, B. (2008, March 27). Finding Political News Online, the Young Pass It On. *The New York Times*.

Stone, B. (2008, March 31). Online Chat, as Inspired by Real Chat. *The New York Times*.

Story, L. (2008, March 9). How Do They Track You? Let Us Count the Ways. *The New York Times*.

Stvilia, B., Twidale, M. B., Smith, L. C., & Gasser, L. (2008). Information Quality Work Organization In Wikipedia. *Journal of the American Society for Information Science and Technology*, 59(6), 983-1001.

Thomas, A., Seiferth, J., & Kelley, G. (2004). Security and Virtual Private Networks (VPNs): An Overview of New Business Models for the Small to Medium Enterprise (SME). *Information Systems: Exploring Applications in Business and Government*, The Information Institute, pp. 189-231.

UN (1948). Universal Declaration of Human Rights, *United Nations General Assembly*, Resolution 217A (III). Article 25(1): "Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control."

USDOJ (2007, August 8). *Criminal Offender Statistics: Summary Findings*. United States Department Of Justice, Office Of Justice Programs, Bureau Of Justice Statistics. Available online at http://www.ojp.usdoj.gov/bjs/crimoff.htm

Web 2.0 (n.d.). Wikipedia: The Online Encyclopedia. Available online at http://en.wikipedia.org/wiki/Web_2.0

Whittaker S. L., Adkins S., Phillips R., Jones J., Horsley M. A., & Kelley G. (2004). Success Factors In The Long-Term Sustainability Of A Telediabetes Programme. *Journal of Telemedicine and Telecare*, 10(2), pp. 84-88.

Wolfram, D. (2008). Search Characteristics In Different Types Of Web-Based IR Environments: Are They The Same? *Information Processing & Management*, 44, 1279-1292.

Y2K38 (n.d.). Wikipedia: The Online Encyclopedia. Available online at http://en.wikipedia.org/wiki/Year_2038_problem

Yee, R. (2008). *Pro Web 2.0 Mashups: Remixing Data and Web Services.* Berkeley, CA: Apress.