Five Trends Affecting Testing

1. Globalization of software and systems development
2. Automation of testing, especially early testing
3. Commoditization of information technology and high technology
4. Compliance, regulation, and tort law
5. Education and certification

Trend 1: Globalization

- Falling communications costs and practice with outsourcing make chasing low-cost labor a winning trend
- Your job might go to India—or, worse, the Philippines
- Find outsource-proof/outsource-friendly jobs
- Work for a company or partnership with outsourcing capability
- Ed Yourdon's *Outsource* for tips and other resources

Salary of a Typical Software Engineer

Country	Salary	Country	Salary
United States	60	Ireland	40
Germany	56	Mexico	31
United Kingdom	50	Puerto Rico	25
France	42	South Africa	23
Australia	38	Poland	19
Israel	36	Russia	13
Japan	34	India	7
New Zealand	33	Philippines	3

Median annual salary (US$ thousands) from payscale.com, whose salary survey is statistically problematic, but illustrative.

Case Studies of Outsource Friendly Jobs

- Facilitating / managing outsource testing
  - Computer vendor based in the US sourcing laptops from Taiwan
  - Computer vendor based in Japan (with US offices) sourcing laptops from Taiwan and Japan
  - Internet appliance vendor based in the US sourcing appliances from Taiwan
  - Bank based in US sourcing system from US company
  - Entertainment company based in Canada sourcing components from various US vendors
- I helped these clients achieve good testing through a combination of on-site and off-site outsourcing

Trend 2: Test Automation

- Automation has moved beyond regression testing at the graphical user interface
  - Unit testing (e.g., test driven development)
  - Load testing
- △ Testers who can't program can't automate
- ↯ Learn to program
- ↯ Learn scripting languages
- ↯ Learn automated testing tools
- ➢ A beginning C++, Java, or scripting book
- ➢ Test tool list at www.tejasconsulting.com

Automation Types and Options

Interface	**Examples**	**Program?**	**Trend**
API	JUnit / CppUnit (free) C++-Test / J-Test (pay) Cantata (pay)	Yes, in the language under test	Growing
CLI	Ruby (free) Cygwin (free) TCL (free / pay)	Yes, in a scripting language	Growing
GUI	TestQuest (pay) SilkTest (pay) Perl::GUITest (free)	Yes, in tool language	Saturating

Trend 3: Commoditization

- Will high tech and IT become commodities like electricity and transportation?
- High-profit-margin companies might have to learn to live with lower profits
- Understand commoditization implications
- Expect increased emphasis on quality, interoperability, usability, etc.
- Connect high tech / IT with business value
- Nicholas Carr's *Does IT Matter* for analysis

Three Historical Analogies

- Electricity
  - Once a source of strategic advantage
  - Now a commodity input
- Textiles
  - Machine looms and cheap labor eliminated jobs
  - Attempts to resist (Luddites) or find a political solution (tariffs) have failed
- Automobiles
  - Planned obsolescence and low quality through 60s
  - Japanese companies introduced high-quality, low-cost basic automotive transportation

The Computer Hardware Analogy

- As with outsourcing, computer hardware commoditization is ahead of software
- Hardware outsourcing became big in the early 90s, about 10 years before software outsourcing
- Currently, most enterprise application vendors get two-thirds of revenue from maintenance and service
- That was once true of hardware, too, but is certainly not true for most hardware now
- "InfoWorld" columnist Tom Yager wrote, "The yawning sameness of a commodity market is precisely where I wanted the PC to go."
- The leading edge of commoditization is visible in software: Consider Linux and Apache

The Differences, and Why They Matter

Differentiable Goods

- Unique features
- More features drive higher prices
- Early adopters accept bugs
- Constrain users with incompatibilities, etc.
- Users must tolerate prickly interfaces

Commodity Goods

- Adequate, consistent quality
- Equal features, so vendors compete on price
- Later adopters reject bugs
- Expected to work with other vendors' offerings
- Must be easy to use by non-specialists

As software and systems become commodities, users will demand cheaper, better-tested, higher-quality products

Trend 4: Compliance, Regulation, Tort Law

- Industry standards, legal regulations, and changing liability standards
- Will your company be sued or barred from the market?
- Risks associated with non-compliance and regulatory violations are growing
- Testing is a risk-mitigation strategy
- Consider adding security to your list of skills
- www.google.com and www.stickyminds.com, search for “Sarbanes Oxley” and “computer security”
- Read the Risks Digest at //catless.ncl.ac.uk/Risks

Three Recent Examples

In the European Union

- The EU took action against Microsoft
- The EU considered bundling of the Windows Media Player with Windows anticompetitive
- Microsoft could find itself barred from the EU market should they fail to comply with this ruling

In the United States

- Healthcare systems must observe HIPAA to protect patient privacy
- This law has significantly affected the workload for test groups in these companies
- Employers must protect employees' information against identity theft

Testing systems for compliance with various standards and laws will continue to grow in importance

Trend 5: Education and Certification

- Education options are wide and varied
- Certification is sweeping the software and systems engineering field
- If your skills fall behind, you become non-competitive—a bad thing in an outsourced world
- Self-study, take training, get educated / certified—but be a smart, picky shopper
- Get certification information on the Internet
- Check out www.istqb.org

Test Education

- Universities provide some test education
  - In 80s, I had one lecture on testing in my software engineering course
  - In the last five years, four professors have told me they were using my books and materials to teach courses on testing
- Private training companies lead the way
  - I have presented hundreds of trainings around the world
  - Training providers offer testing courses in most software-developing countries
- Nevertheless, most test practitioners remain in the dark on even the most basic techniques
- Unlike programming, testing has not built on the foundations

Certifications for Testers to Consider

Type	Examples	Trend
Testing	ISTQB Foundation, ISTQB Advanced, QAI, …	Growth
Test tools	Mercury (8), Segue (2), Rational (2),…	Some growth
Technology	Linux+, RHCE,… Microsoft (8), Oracle	Some growth
Specialties	CISSP, Security+,… Certified Usability Analyst…	Big growth

Certification programs establish the essentials of the topic that all competent practitioners must know

What Now?

- Major changes underway for IT / high-tech
- Learn to sail into the wind
- Disruptions create opportunities for those quick enough to seize them
- Consider how the major trends will affect testing and plan your career moves accordingly
- Take control of your career development, and see your employer as only one resource