Demography of the software development industry — past and future

Jan Sliwa

Bern University of Applied Sciences
Motivation – my personal experience

- 1977 (23) ↑ job offer in Poland
- 1981 (27) ↑ invitation to Switzerland
- 1991 (37) ↑ management position
- 1994 (39) ↓ first mass unemployment in Switzerland
- 1999 (45) ↑ job found in 3 weeks
- 2002 (48) ↓ crisis: low demand, large supply
- 2006 (52) orange job at the University
- 2012 (58) ↑ still there 😊
Motivation – my personal experience

2002

Dry market

And me?
Outline

- Motivation
- Software industry demography – flows and processes
- IT specialist as a human
- IT areas
- Demand
- Supply
- Offshoring, nearshoring, rightshoring
- Conclusions – lessons learned
Software industry demography

- Flows and processes – basic model
Software industry demography

- Flows and processes – fine model
IT specialist as a human - evolution

- skills
- speed
- flexibility
- experience
- soft skills
IT specialist as a human - personality

- Temperament type (Keirsey)

- Skills
  - writing code (quantity, quality) ... ominous skill list
  - understanding requirements
  - understanding customer’s problems
  - reading code
  - working in team

- Productivity from -1 (yes!) to 10 and more → “expensive” programmer is a bargain!
40 years career – my younger days

1972

1977

1982
40 years career – past and future

1977  2007 now 2019  2047

Me

You
Skills – short term, long term

1977

1977

now

2019

Fortran

Assembler

Pascal

C

C++

Java

Struts

JSP

JSF

SQL
Skills – short term, long term

1977 – now – 2019

- **Structured**
- **Event-driven**
- **Object-oriented**

- Fortran
- Assembler
- Pascal
- C
- C++
- SQL
- Java
- Struts
- JSP
- JSF
Skills – short term, long term

1977 now 2019

Fortran Assembler Pascal C C++ Java

Structured Event-driven Object-oriented

Logical thinking

SQL

Struts JSP JSF
Skills – short term, long term

1977 – now

- Assembler
- Pascal
- C
- C++
- Java
- Fortran
- SQL
- JSF
- Struts
- JSP
- Logical thinking
- Structured
- Event-driven
- Object-oriented
Experience...

Programming an infusion pump

**Infusion mode**

Bolus duration

00:20:00  \textbf{hh:mm:ss}

Just a numerical value?
Experience...

Programming an infusion pump

- unclear description
- no validation
- small letters

Infusion mode

Bolus duration

00:20:00 hh:mm:ss

Just a numerical value?

Programming errors (minutes instead hours)

Death cases
Experience...

Programming an infusion pump

- unclear description
- no validation
- small letters

Bolus duration

Just a numerical value?

Programming errors (minutes instead hours)

Death cases

Being quick is not everything
Understand what are you doing, why and for whom
... and this is experience
Demand

- Nothing grows exponentially forever
- Saturation – 1000 apps in your smartphone?
- Technical catastrophe
  - satelites destroyed by solar flares
  - radio waves causing cancer
  - breaking the hard cryptography
- Major disruptive events:
  - Earthquakes, floods, wars, terrorist attacks, asteroids...
- Lost interest
Supply – various skills

- **Development**
  - Web
    - Java, JEE
    - C#, .NET
  - mobile
  - embedded

- **Support**
  - Microsoft
  - Linux
  - DBA
    - Oracle
    - MySQL

- **Legacy skills**
  - COBOL
  - Smalltalk
  - C, C++
  - ...

- **Other cultures**
  - PHP
  - Visual Basic
  - ...

Supply – demographical structure

1980

Professor
Assistants
Students

Cool profession:
• conquistadors
• rocket scientists
• computer geeks

2012

"Baby boomers"
Internet bubble - easy money
New generation

Now: just a profession like any else?
• lower social status
• do girls like nerds?

not all can be managers
Supply - productivity

- Software development: older days
  - tedious technical means, slow compilation, difficult testing
  - all code hand-written
- Software development: now
  - Integrated Development Environments
  - flexible frameworks, but more complex applications
- Software development: future (unknown)
  - better and better efficiency
  - manual work still necessary
- There is no silver bullet
Offshoring, nearshoring, reshoring, rightshoring

- Original enthusiasm
  - all development in India / Soviet Union / Eastern Europe...
- Reflection
  - frequent, personal contact necessary
  - understanding the customer
  - cultural barriers
  - data protection
- Migrations of jobs, migrations of engineers
- And in the future?
  - rightshoring
IT is like ... Formula 1

Managing human resources (including your own) in IT is like driving a Formula 1 racing car, but with:

- changing circuit
- changing rules
- new participants entering the race
- changing goal
Conclusions – lessons learned

- IT specialists
  - develop technical skills
  - develop soft skills
  - adapt working style
  - geographical / cultural flexibility
  - make your tasks evolve (consider changing profession)
Conclusions – lessons learned

- Companies
  - match flexibly supplied and required skills
  - select / keep / promote best workers
  - observe market demand evolution
  - plan carefully use of new and old technologies
Conclusions – lessons learned

- Universities
  - teach a balanced skill mix
    - ready to use
    - long term basis
  - teach how to adapt in a changing world
Conclusions – lessons learned

- IT specialists
- Companies
- Universities

Be flexible!

Будь гибким!
Thank you for attention!

Спасибо за внимание!

Jan Sliwa
Bern University of Applied Sciences
jan.sliwa@bfh.ch