Software Failures

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Recall: Criteria for success

For the purposes of this course, a software project will be considered successful if:

- The software is delivered on schedule,
- Development costs were within budget, and
- The software meets the needs of users (in scope and quality)
£12bn computer system scrapped

MINISTERS are to axe Labour’s disastrous £12billion NHS computer scheme.

The Coalition will today announce it is putting a halt to years of scandalous waste of taxpayers’ money on a system that never worked.

It will cut its losses and ‘urgently’ dismantle the National Programme for IT – a monument to Whitehall folly during Labour’s 13 years in power.

The biggest civilian IT project of its kind in the world, it has already squandered at least £12.7billion. Some estimates put the cost far higher and analysts say the sum would have paid the salaries of more than 60,000 nurses for a decade.

The announcement follows strong criticism from MPs who accused Labour of wasting a further £500million of taxpayers’ money on a failed bid to set up a network of regional Fire Brigade control centres south of the Border. Following an official review, the ‘one size fits all’ IT project will be replaced by much cheaper regional initiatives, with hospitals and GPs choosing the IT system they need. And a new national watchdog will be established to ensure such huge sums can never again be thrown away on uncosted projects.

Labour’s National Programme for IT included a range of schemes to modernise the Health Service, including a national email system and the ability to transfer X-rays and prescriptions electronically.

The decision to accelerate the dismantling of the scheme has been made by Health Secretary Andrew Lansley and Francis Maude, the Minister for the Cabinet Office. It follows new advice produced by the Major Projects Authority, set up by the Coalition to review Labour’s big financial commitments to see if they provide value for money.

The authority said of the IT scheme, set up in 2002: ‘There can be no confidence the programme has delivered or can be delivered as originally conceived.’

The report, seen by the Mail, recommends the Government should ‘dismember the programme and reconstitute it under new management and organisation arrangements’.

Mr Lansley said: ‘Labour’s IT programme let down the NHS and wasted taxpayers’ money by imposing a top-down IT system on the local NHS, which didn’t fit their needs.

John Prescott, who as Deputy Prime Minister ordered the scheme, blamed civil servants for the fiasco. He told BBC Radio 4’s Today programme they had kept ministers in the dark over the ‘unbelievable’ scale of the ‘disaster’.

Daily Mail, 9th September, 2011

NHS Connecting for Health

“Originally expected to cost 2.3bn GBP over three years, in 2006 the total cost was estimated ... to be 12.4bn over 10 years...”

“Officials ... estimat[ed] the final cost to be as high as 20bn, indicating a cost overrun of 440% to 770%...”

“This is the biggest IT project in the world and it is turning into the biggest disaster.” ... despite a probable expenditure of 20 billion pounds “it is unlikely that significant clinical benefits will be delivered...”

<table>
<thead>
<tr>
<th>Rank</th>
<th>Country</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>82</td>
<td>Lithuania</td>
<td>£22.9bn</td>
</tr>
<tr>
<td>83</td>
<td>Costa Rica</td>
<td>£22.6bn</td>
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<tr>
<td>84</td>
<td>Kenya</td>
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<td>99</td>
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<tr>
<td>101</td>
<td>Paraguay</td>
<td>£11.6bn</td>
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2010 World Bank ranking of 190 countries by GDP
Why Software Projects Fail

Software appears, by its nature, to be difficult to engineer on a large scale. Nevertheless, there is an insatiable demand for sizeable, well-engineered software.

We continue to be dogged by large numbers of project failures, on small and large projects. Many (most?) of these are due to mistakes in project management.

In this lecture we discuss:

- Examples of project failure on a large scale
- Lessons that can be learned
Scale of the Problem

1994 Standish report, for the failure criteria in this course:

- 91% of projects at large companies failed
- 30% of projects at large companies were eventually cancelled

Overall project failures (as defined in this course) per year, from Standish figures:

<table>
<thead>
<tr>
<th>Year</th>
<th>Failure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>84%</td>
</tr>
<tr>
<td>1996</td>
<td>73%</td>
</tr>
<tr>
<td>1998</td>
<td>74%</td>
</tr>
<tr>
<td>2000</td>
<td>72%</td>
</tr>
<tr>
<td>2002</td>
<td>66%</td>
</tr>
<tr>
<td>2004</td>
<td>71%</td>
</tr>
<tr>
<td>2009</td>
<td>68%</td>
</tr>
</tbody>
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Clearly, when starting a project, one can expect it to fail.
The US Federal Bureau of Investigation has often been criticized for not sharing leads between agents and divisions.

Just before the 2001 terrorist attacks, the FBI hired Science Applications International Corp (SAIC) to develop Virtual Case File software (VCF).

VCF was designed to manage case files electronically, so that any agent with suitable permissions can find relevant information.

Originally scheduled for completion in 2003.
FBI Virtual Case File (2)

After repeated delays, a version was delivered in December 2004, but:

- Was about one tenth of originally promised
- Was eventually scrapped altogether
- Does not approach functionality of existing commercial packages
- Used as an extremely expensive prototype
- About $170 million wasted
FBI Virtual Case File (3)

Apparent causes:

- Changing requirements (after the September 11 attacks)
- Ambitious project, run as an emergency fix
- 14 different managers over project lifetime
- Poor oversight of external contractor
- Not paying attention to new, better commercial products
- Hardware purchased already; waiting on software
Supply Chain Management (1)

- **Background**: Supply chain management crucial in price war between Sainsburys and Tesco.

- **pre-2000**: Sainsbury’s had “mainframe-based warehouse management system”; “400 different supply chain software applications”.

- **2000**: new CEO Peter Davis authorised outsourcing IT to Accenture, aiming to get an “agile IT infrastructure built on an open, adaptive, scalable architecture with hardware and software systems that would give very high performance, strong data security, and low total cost of ownership.” Key supplier Sun.
Supply Chain Management (2)

- **May 2004:** “The $1.8 billion overhaul is well under way, and will be completed in 2005.”; “The relationship with Accenture has worked so well that Sainsbury’s has chosen to extend its IT outsourcing contract for another three years, until 2010 — a move that should allow the retailer to net additional cost reductions of more than $230 million by 2007.”

- **July 2004:** Davis resigns — poor financial performance

- **October 2004:** New system unable to track stock correctly. Shops go short. Sainsbury’s recruits 3000 shelf stackers to handle crisis, writes off $260m IT spend, renegotiates contract with Accenture. Accenture blames poor reliability of four fully automated depots, not covered by their agreement; new Sainsburys CEO Justin King blames Accenture.

- **October 2005:** Outsourcing cancelled, IT brought back in house.
Supply Chain Management (3)

Apparent causes of problems with the Accenture attempt:

- Weak outsourcing governance
- Loss of staff with knowledge about legacy systems
- Risky “big bang” approach
- Political in-fighting
- Generally poor business management

[Main source: Douglas Hayward in a 2005 silicon.com article]
Customer Database System (1)

In 1996 a US consumer group embarked on an 18-month, $1 million project to replace its customer database. The new system was delivered on time but didn’t work as promised, handling routine transactions smoothly but tripping over more complex ones.

Within three weeks the database was shut down, transactions were processed by hand and a new team was brought in to rebuild the system.
Customer Database System (2)

Problems:

- The design team was over-optimistic in agreeing to requirements
- Developers became fixated on deadlines, ignoring errors
Customer Tracking System (1)

In 1996 a San Francisco bank was poised to roll out an application for tracking customer calls. Reports provided by the new system would be going directly to the president of the bank and board of directors. An initial product demo seemed sluggish, but telephone banking division managers were assured by the designers that all was well. But the system crashed constantly, could not support multiple users at once and did not meet the bank’s security requirements. After three months the project was killed; resulting in a loss of approximately $200,000 in staff time and consulting fees.
Customer Tracking System (2)

Problems:

- The bank failed to check the quality of its contractors
- Complicated reporting structure with no clear chain of command
- Nobody “owned” the software
Payroll system (1)

The night before the launch of a new payroll system in a major US health-care organization, project managers hit problems. During a sample run, the off-the-shelf package began producing cheques for negative amounts, for sums larger than the top executive’s annual take-home pay, etc. Payroll was delivered on time for most employees but the incident damaged the relationship between information systems and the payroll and finance departments, and the programming manager resigned in disgrace.
Payroll system (2)

Problems:

- The new system had not been tested under realistic conditions
- Differences between old and new systems had not been explained (so $8.0 per hour was entered as $800 per hour)
- “A lack of clear leadership was a problem from the beginning”
Critical Failure Factors (1)

Warning signs of a project doomed to failure, or even disaster, from Flowers (1996):

- Organization: hostile culture, poor reporting structures
- Management: over-commitment, political pressures
- Conduct of the project:
  - Initiation phase: technology focused, lure of leading edge, complexity underestimated
Critical Failure Factors (2)

- Conduct of the project (continued):
  - Analysis and design phase: poor consultation, design by committee, technical fix for management problem, poor procurement
  - Development phase: Staff turnover, poor competency, poor communication (e.g. split sites)
  - Implementation phase: receding deadlines, inadequate testing, inadequate user training
Summary

- SW development is inherently a risky process
- Many projects fail for the same reasons
- Unfortunately, hindsight is much clearer than foresight, but
- The risk of failure should be addressed from the very start
References