Information Systems Development Performance in the 21st Century

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Motivation for Research

- In younger days, programmer on many large development projects (IBM, United Airlines, Advanced Micro Devices, Levi Strauss, Texas State Agencies)
- Many projects were obviously failing long before money removed

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- In the United States the best known IS project failures are the
  - the California Motor Vehicles Driver Licensing System (Bozman, 1994), and
  - Denver airport baggage handling system (Montealegre & Keil, 2000).
  - FBI Trilogy Project (Knorr, 2005; US GAO, 2006),

- Besides infamy, what obvious characteristic do these three projects share?

They are all government agencies

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- in the 1980s and 1990s, what do you think failure rate was?

  routinely found > 50%

- What was the best predictor of failure?

  scope of the project

- What percent on time and in budget?

  (Johnson, 1995) → only 16%

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- Got some ideas why this was happening from a management colleague & we published a paper:

  Wright & Capps. 2010. Runaway Information Technology Projects: A Punctuated Equilibrium Analysis. Oct. Dec. 2010, Vol. 1, No. 4.

- Today I presents the results of my 2009 survey of about 130 US IT auditors

  Wright, M. 2010. Information Systems Development Project Performance in the 21st Century. ACM SIGSOFT Software Engineering Notes. March2010 Vol. 35, No. 1.

- Explored auditor perceptions about root causes of IS development project problems.

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- Survey defined three types of projects:

1. "Problematic"
   between 50% and 100% over budget and behind schedule
2. "Failed"
   killed and believed to cost more to develop than to use
3. "Runaway"
   more than double over budget and behind schedule

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- Runaways of particular interest to IS researchers.
  - Said to take on a life of their own -- disconnected from larger enterprise (Zmud, 1980; DeMarco, 1982; Mahring & Keil, 2008).
  - run wildly over time and budget (Glass, 1998; Mann, 2003).

- Based on psychology research:
  - "escalation of commitment to a failing course of action" (Brockner, 1992; Keil, 1995; Schmidt & Calantone, 2002).

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- My survey research is based on the “punctuated equilibrium” theoretical framework rather than a “stage” model.
- exploratory research

Punctuated equilibrium

- Originally identified in evolutionary biology (Eldredge & Gould, 1972)

- In a number of industries, it has been observed that long periods of unsuccessful "incremental" organizational change tend to be interrupted by short periods of radical change called "revolutionary periods“ (Abernathy & Utterback, 1978; Utterback & Suarez, 1993; Tushman & Anderson, 1986; Mokyr, 1990). This pattern termed "punctuated equilibrium"

- According to punctuated equilibrium theory, organizations tend toward "equilibrium" because of the permanence of the organization’s "deep structure”.

Our general research questions

- Effects of IT governance practices after the 2002 Sarbanes Oxley Act.
- “Runaway” projects still common?
- “Is punctuated equilibrium” theory a promising new area for future research in preventative measures?
- When are radical organizational changes needed?

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- How many of you involved with a "runaway" ?
  - 40% of the respondents involved with a "runaway,"
- What do you think avg. perceived rate for problematic projects?
- What do you think the avg. perceived rate of failed projects?

Both above 50% (See table 4.)

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Table 4: Perceived Overall Project Performance

Measurement Construct	Survey Question #	Response Choice	Responses
Project failure rate	2.1	Greater than 50%	62.5%
		Less than 50%	37.5%
Problematic project rate	2.5	Greater than 50%	65.0%
		Less than 50%	35.0%
Problematic projects become runaway	3.5	Greater than 50%	**66%
		Less than 50%	**33%
Rate at which runaways are turned around	3.10	Less than 20%	71.6%
		Greater than 20%	28.4%
Premature project termination rate	3.12	Less than 20%	55.4%
		More than 20%	44.6%

** indicates that differences in the proportions are not statistically significant

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- The findings regarding “runaways” contrast sharply with researchers who contend that runaways are rare events (Glass, 1997).

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Sources of project problems

- The most important sources of problems for both "problematic" and "runaway" projects were perceived to be formal attributes of the project team such as
  - size , skills
- rather than informal social or psychological attributes of project stakeholders (see Table 6.)

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Table 6: Perceived Causes of Runaway Projects

	Response Choice	Most likely	Least likely
Survey Question 3.9	Formal attributes of the project	75%	25%
	Formal attributes of	63%	37%
	Informal social	27%	73%
	Psychology of individual project	45%	55%

Conclusions:

Corrective actions, incremental or radical?

- For "runaways" respondents believed it more beneficial to choose the radical action of replacing project management rather than the incremental action, simply educate them.
- However, for "problematic" projects, the respondents reported the opposite
- Managers risk averse to killing bad projects
  - They kill them only about 20% of the time.

    (See Table 4) survey question 3.12.
- Our results are consistent with the punctuated equilibrium argument

  (See Table 7, 9):

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Table 7: Punctuated Equilibrium: the "Deep Structure" Theorem

8.1	If an organizational structure is controlled by elected government officials, its "deep structure" is harder to change than that of private industry.
8.2	If the deep structure" of an organization is relatively harder to change, it will be relatively more likely to produce over-committed projects.
8.3	If management is over-committed to a project, it is more likely to runaway or fail.
8.4	Therefore runaway projects and failed projects should be expected to occur more often in government than in the private sector, all other things equal.

Table 9: Punctuated Equilibrium: the Revolutionary Changes Theorem

9.1	The "deep structure" of an organization consists of more members of top management than of project management.
9.2	The deep structure of an organization is more likely to be changed by a radical (or revolutionary) change than by a more modest (or incremental) change (Gersick, 1991).
9.3	Replacing top management constitutes a more radical organizational change than does educating top management.
9.4	Radical organizational changes are more effective in correcting runaway projects than are incremental changes. (From 8.2, 8.3 and 10.1 – 10.3)

Conclusions:

- Performance no better after Sarbanes Oxley
- Project factors are more important than the larger organizational factors
- Better to correct project management than top management
- Performance worse in government (See table 8.)

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Table 8: IS Project Performance: Government versus Private Sector

Measurement construct	Survey Question #	Government Sector	Private Sector
Most likely sector for problematic projects	2.6	71.3 %	28.8%
Most likely sector for failed projects	2.3	78 %	21%
Most confident sector	2.2	11.2 %	89%
Most likely sector for runaway projects	3.11	80.0 %	20.0%

End, thank you.