Research Perspectives on Operational Audits and Certification

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The Independent Association of Accredited Registrars
Milwaukee Meeting
July 7, 2010
Agenda

1. Introduction
2. Evaluation
3. ISO 9001 study
4. Some ongoing research
5. Future research
About me

• Industry experience
  – Operations (banking)
  – EHS consulting
  – Corporate EHS Director
    • Internal policies, procedures, training, auditing
    • ISO 14001 and Responsible Care

• Harvard Business School
  – Teach MBAs and PhDs
  – Case studies
  – Large-N data analysis
My research focus

Q1. Adoption
What leads some facilities (firms) to adopt voluntary environmental management programs?
- Private programs: ISO 14001, CDP
- Government programs: EPA Audit Policy
- Also quality programs (ISO 9001), H&S programs

Q2. Evaluation
Which programs lead to improved performance?
- Operational metrics: Emissions, environmental compliance, injuries, productivity
- Business metrics: sales

Target audiences: Academics, EHS, auditors
Why am I here today?

1. I was invited (thanks John, Milt, Pierre)

2. To share some research findings and ideas

3. To ask for your research questions
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Sample evaluation questions

Outcomes

• Does ISO 14001 adoption lead to lower pollution? Improved compliance?
• Does ISO 9001 adoption lead to fewer defects?

Contingencies (does it depend on...)

• Facility: size, motive, industry, country
• CB: Accredited?
• CB auditor: Training? Experience?
• Audit: Duration?
Conducting evaluations (1/3)

Metrics

- Objective vs. subjective measures

Approach

- Track performance over time
  - Pre-adoption data
  - Post-adoption data
- Compare to “similar” non-adopters
  - Most challenging step. For best results, randomize
Conducting evaluations (2/3)

For more on conducting evaluations in (mostly) plain language, in the context of codes of conduct...

Evaluating the impact of SA8000 certification

Michael J. Hiscox and Claire Schwartz
Department of Government, Harvard University, United States

Michael W. Toffel
Harvard Business School, United States
Conducting evaluations (3/3)

Use academics as a resource

- Trained in research design and data analysis
- Will often work for data access (or $).
- Need freedom to publish, but can anonymity & non-disclosure are negotiable
- If disinterested, avoids real and perceived conflicts of interest
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A recent evaluation of ISO 9001

Quality Management & Job Quality: How ISO 9001 affects employees & employers

David I. Levine
UC Berkeley

Mike Toffel
Harvard Business School

Employee outcomes
- Employment
- Wages
- Injury rates
- Injury costs

Organizational outcomes
- Sales
- Employment
- Productivity (sales/employee)
A recent evaluation of ISO 9001

Key results

**Employee outcomes**
- Employment
- Wages
- Injury rates
- Injury costs

**Organizational outcomes**
- Sales
- Employment
- Productivity (sales/employee)
Data

**WCIRB (Workers’ compensation insurance rating board)**
- Workers’ compensation claims
- Payroll
- Riskiness of occupational mix

**D&B**
- Sales
- Employment
- Geographic region
- Industry

**QSU Publishing**
- ISO 9001 certification years
Sample

- California
- Single-plant firms
  - ISO 9001 certification at facility-level
  - Sales, wages, injury, etc. data available at firm level.
- Purchase worker’s compensation insurance (not self-insured)
  - 1,418 adopters + 20,777 non-adopters
Empirical approach: differences in differences

Outcome
(sales, injuries, etc.)

Non-adopters (control group)

Adopters (treatment group)

Certification

Time

ISO 9001 effect

Unobserved (estimated)
Our analysis yields unbiased results only when the non-adopters is a plausible comparison group

The comparison group would share two features with adopters:

1. **SELECTION**
   Similar characteristics related to ISO 9001 adoption (industry, size, etc.)

2. **PRE-EXISTING TRENDS**
   Similar outcome trends in the pre-period

Construct a matched control group
We identify a matched group of treatments and controls that had similar pre-period...

- Injury costs
- Injury rate
- Payroll
- Employment
- Wage
- Sales
- Occupational riskiness
Summary of results (1/2)

Compared to matched controls, ISO 9000 adopters had...

• Higher survival
  Proportion of firms that disappeared from our dataset between adoption year and 2003: 0.5% of adopters vs. 7.1% of comparison

• Higher sales
  Adopters subsequently had 9% higher sales than non-adopters

• Higher employment
  Adopters subsequently had 10% more employees than non-adopters

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Summary of results (2/2)

Compared to matched controls, ISO 9000 adopters had...

• Higher wages
  Adopters subsequently had 7.5% higher wages than non-adopters

• Slightly increased odds of zero injuries
  Adopters were subsequently 5 percentage points more likely to report zero Worker’s Comp claims than controls (beyond overall mean of 28%)

  But no evidence that adopters subsequently differed from controls in annual injury costs or rate
Caveats

Generalizability

- Single-plant firms
- California only
  - California has strong H&S regulations
For more details, see the article...


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Ongoing research project #1

When a corporation rolls out ISO 9001 and ISO 14001 to its plants, how does it decide which are in the 1st wave?

1. Buyer pressure (direct customers urging adoption)
2. Complexity: Typical, least, most?
3. Proximate to HQ: to observe, provide corp. support
4. Plant management: willingness or obstinate?
5. Other factors?
Ongoing research project #2

Assessing the effectiveness of code of conduct assessments, using data on 20,000+ audits over 4 years.

1. Which types of violations are most likely to re-appear in future audits? Least likely?
2. Do unannounced audits yield different (and more) violations than announced audits?
3. Do 2\textsuperscript{nd} party audits yield different violations than 3\textsuperscript{rd} party audits?
4. What types of violations are experienced auditors particularly good at detecting?
5. ?
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Future research projects

What research questions do you want answered?

1.
2.
3.
4.
5.
6.
7.