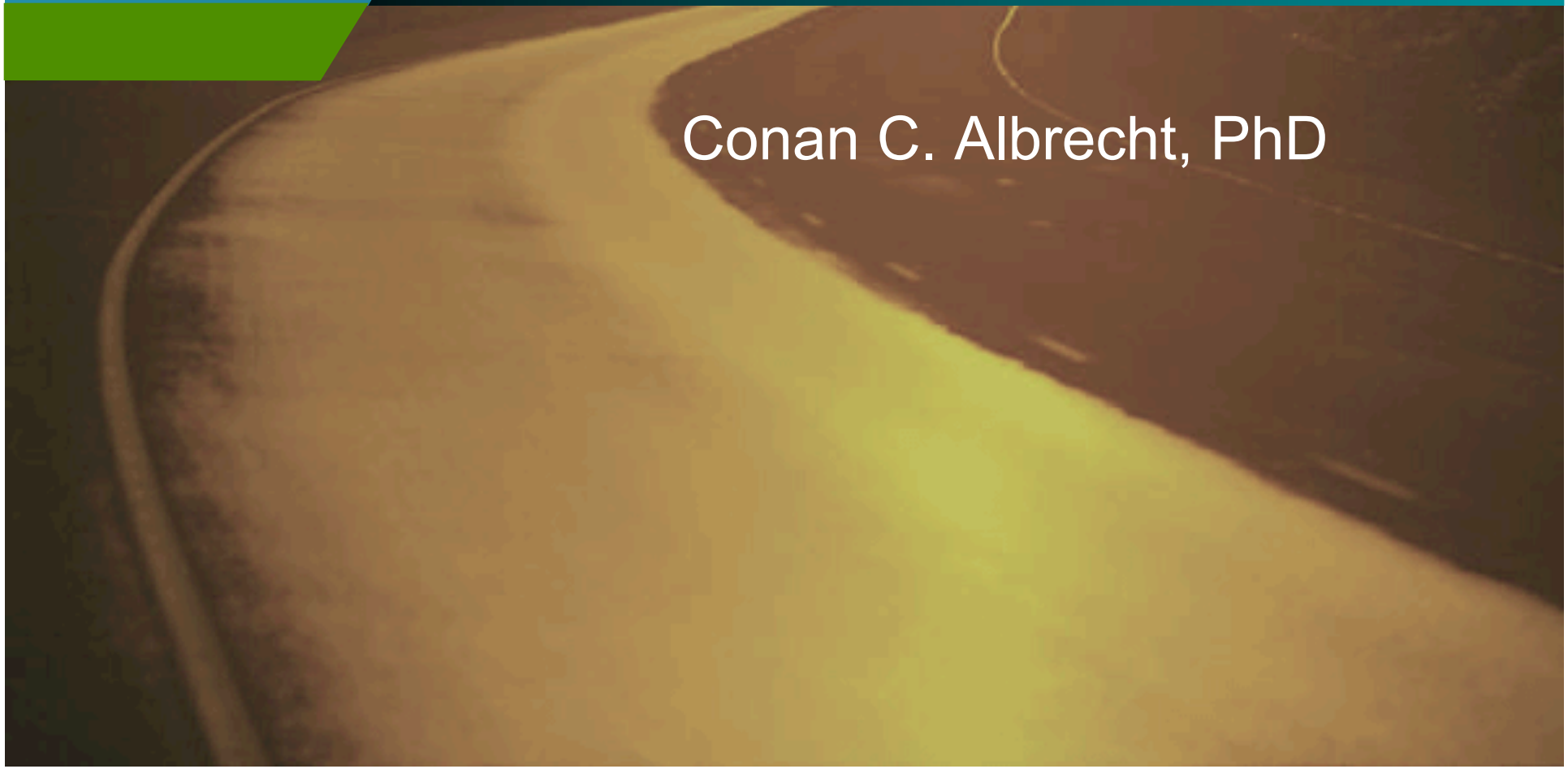
Proactive Fraud Detection

Conan C. Albrecht, PhD




WIZARD OF ID
BLUE-COLLAR CRIME IS DOWN, BUT WHITE-COLLAR CRIME IS UP
11-26
C2003 CREATORS SYNDICATE, INC. WWW.CREATORS.COM
YESSS!
WHO SAYS OUR EDUCATION SYSTEM ISN'T WORKING?
PARKER

Source: ACFE Report to the Nation

The Fraud Problem

- US organizations lose 7 percent of revenues to fraud
- Median loss caused by occupational frauds is $175,000; the top quarter are above 1 million
- The typical occupational fraud lasts two years before it is discovered
- The most common scheme is corruption (27%), followed by fraudulent billing (24%)
- Occupational frauds are most often caught because of tips, not by audits, controls, or other means
- Anti-fraud controls have a large impact; for example, organizations with surprise audits had a median loss of $70,000 compared with $207,000 without

Source: ACFE Report to the Nation

The Fraud Problem

- Fraud is most common in banking and financial services, government, and health care.
- Small businesses (< 100 employees) suffer a median loss of $200,000 per year
- Lack of adequate internal controls is the most common factor cited as the reason fraud occurred
- 78 percent of organizations modify anti-fraud controls *after* a large fraud
- Fraud is most often committed by the accounting department or other upper management (and it's much more costly)

Source: ACFE Report to the Nation

The Fraud Problem

- Occupational fraudsters are generally first time offenders (as measured by previous convictions)
- The most common reason cited is living beyond means (39%), followed by financial difficulties (34%)

The Extent of Fraud

- Survey of 5,331 students at 32 graduate schools across the USA and Canada
  - 56 percent of MBAs admitted to cheating
  - 54 percent of Engineering students
  - 50 percent of Science students
  - 48 percent of Education students
  - 45 percent of Law students
  - 39 percent of Social Science and Humanities students
    - » McCabe, Academy of Management Learning & Education, 2006

The Extent of Fraud

- Cyber-Ark did a survey of 300 system administrators in 2008:
  - 88 percent said they would take sensitive data with them if fired
  - 33 percent said they would take company password lists with them if fired

Cost of Fraud

- Fraud Losses Reduce Net Income $ for $
- If Profit Margin is 10%, Revenues Must Increase by 10 times Losses to Recover Affect on Net Income
  - Losses……. $1 Million
  - Revenue….$1 Billion

Fraud Robs Income!

Revenues	$100	100%
Expenses	90	90%
Net Income	$ 10	10%
Fraud	1	
Remaining	$ 9	

To restore income to $10, need $10 more dollars of revenue to generate $1 more dollar of income.

Fraud Cost….Two Examples

- Automobile Manufacturer
  - $436 Million Fraud
  - Profit Margin = 10%
  - $4.36 Billion in Revenues Needed
  - At $20,000 per Car, 218,000 Cars
- Large Bank
  - $100 Million Fraud
  - Profit Margin = 10 %
  - $1 Billion in Revenues Needed
  - At $100 per year per Checking Account, 10 Million New Accounts

Fraud Internationally—Transparency Int'l

- 1. Finland
- 2. Denmark
- 3. New Zealand
- 4. Iceland
- 5. Singapore
- 5. Sweden
- 7. Canada
- 7. Luxembourg
- 7. Netherlands
- 10. United Kingdom
- 11. Australia
- 16. United States
- 18. Germany
- 20. Japan
- 31. Italy
- 59. China
- 71. Russia
- 96. Indonesia
- 101. Nigeria
- 102. Bangladesh

Internet Corruption (1995)

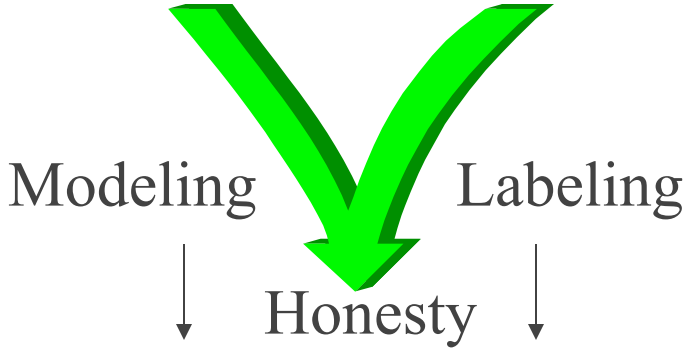
- New Zealand—9.55
- Denmark—9.32
- Singapore—9.26
- Finland—9.12
- Canada—8.87
- Australia—8.80
- Germany—8.14
- USA—7.79
- Hong Kong—7.12
- Japan—6.72
- Malaysia—5.28
- Taiwan—5.08
- Korea—4.29
- Thailand—2.79
- China—2.16
- Indonesia—1.94

Countries that have been dragged down by fraud

- Indonesia
- Philippines
- Eastern European countries
- South American countries
- China
- South Asian countries

Why Dishonesty Is Increasing!

- Bad Modeling/Lack of Good Modeling
  - Makes Up The News
  - Focus of TV/Movies
  - Dishonest “Leaders”
  - Good Models Are Rare



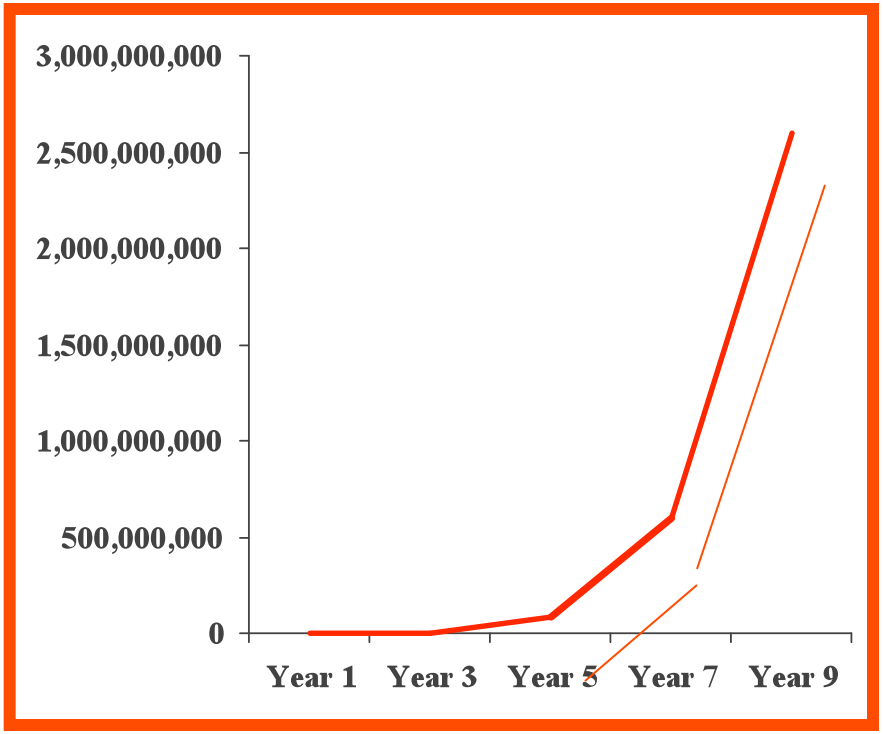
- Lack of Positive Labeling
  - Home….Average Family Spends 10 hours less time together a week
  - Vocabulary of Kindergarten children
  - Schools
  - Churches

Largest Bankruptcy Filings (1980 to Present)

Lehman Brothers, Inc	$691.0 billion	September 2008
Washington Mutual, Inc	$327.9 billion	September 2008
WorldCom, Inc.	$103.9 billion	July 2002
Enron Corp.	$ 65.5 billion	December 2001
Conseco, Inc.	$ 61.4 billion	December 2002
Pacific Gas and Electric	$ 36.2 billion	April 2001
Texaco	$ 34.9 billion	April 1987
Financial Corp. of America	$ 33.9 billion	September 1998
Refco, Inc.	$ 33.3 billion	October 2005
IndiMac Bancorp, Inc.	$ 32.7 billion	July 2008

A Recent Fraud

- Large Fraud of $2.6 Billion over 9 years
  - Year 1 $600K
  - Year 3 $4 million
  - Year 5 $80 million
  - Year 7 $600 million
  - Year 9 $2.6 billion
- In years 8 and 9, four of the world's largest banks were involved and lost over $500 million



Some of the organizations involved: Merrill Lynch, Chase, J.P. Morgan, Union Bank of Switzerland, Credit Lynnaise, Sumitomo, and others.

Why Don't "They" Find Fraud?

- Limited time
  - Our most precious resource is our attention
- History
  - Heavy use of sampling - lack of detail
  - Lack of historical fraud detection instruction
- Lack of fraud symptom expertise
- Lack of fraud-specific tools
- Lack of analysis skills
- Lack of expertise in technology
- Auditors do find 20-30 percent of fraud
  - » ACFE 2004 Report to the Nation

Isn’t there a better way?

Reasonable time requirements

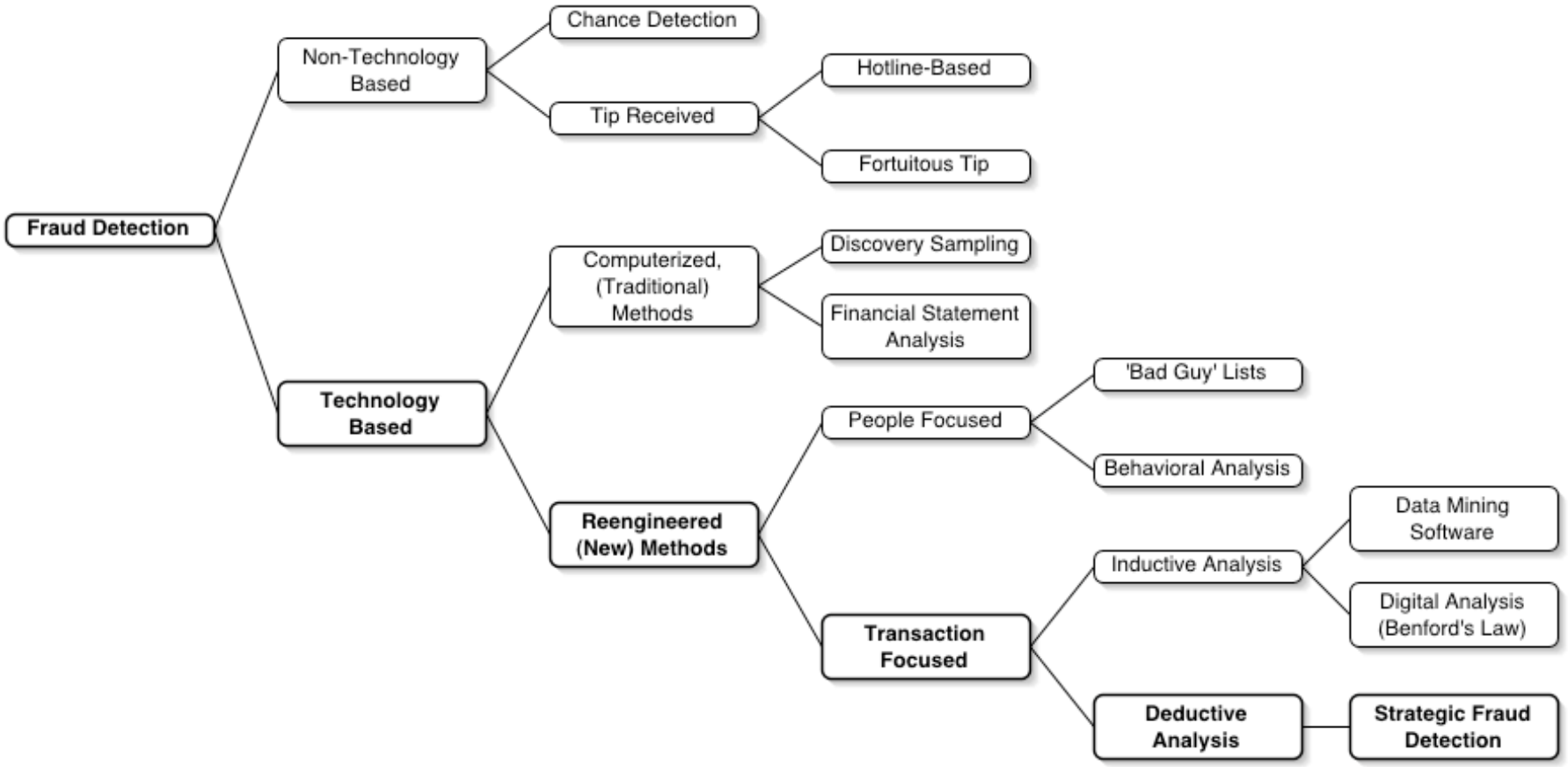
Integrate AI and auto-detection

Within reach of most auditors
(highly technical skills not required)

Integrate easily into different database schemas

Cost effective

Fraud Detection Methods



Fraud Detection

- What is “proactive” fraud detection?
- What is required for proactive fraud detection
- Computer-aided fraud detection skills
  - Database Primer
  - Data Extraction
  - Scripting
  - Analyzing Data
  - Automation

Technology-Based Detection

- Focus on People
  - Comparisons of employees with “bad guy” lists
  - Comparisons of employee attributes with “bad guy” attributes
  - Analysis of employee lifestyle/behavioral changes over time
- Focus on Transactions
  - Statistical and other analysis of corporate data

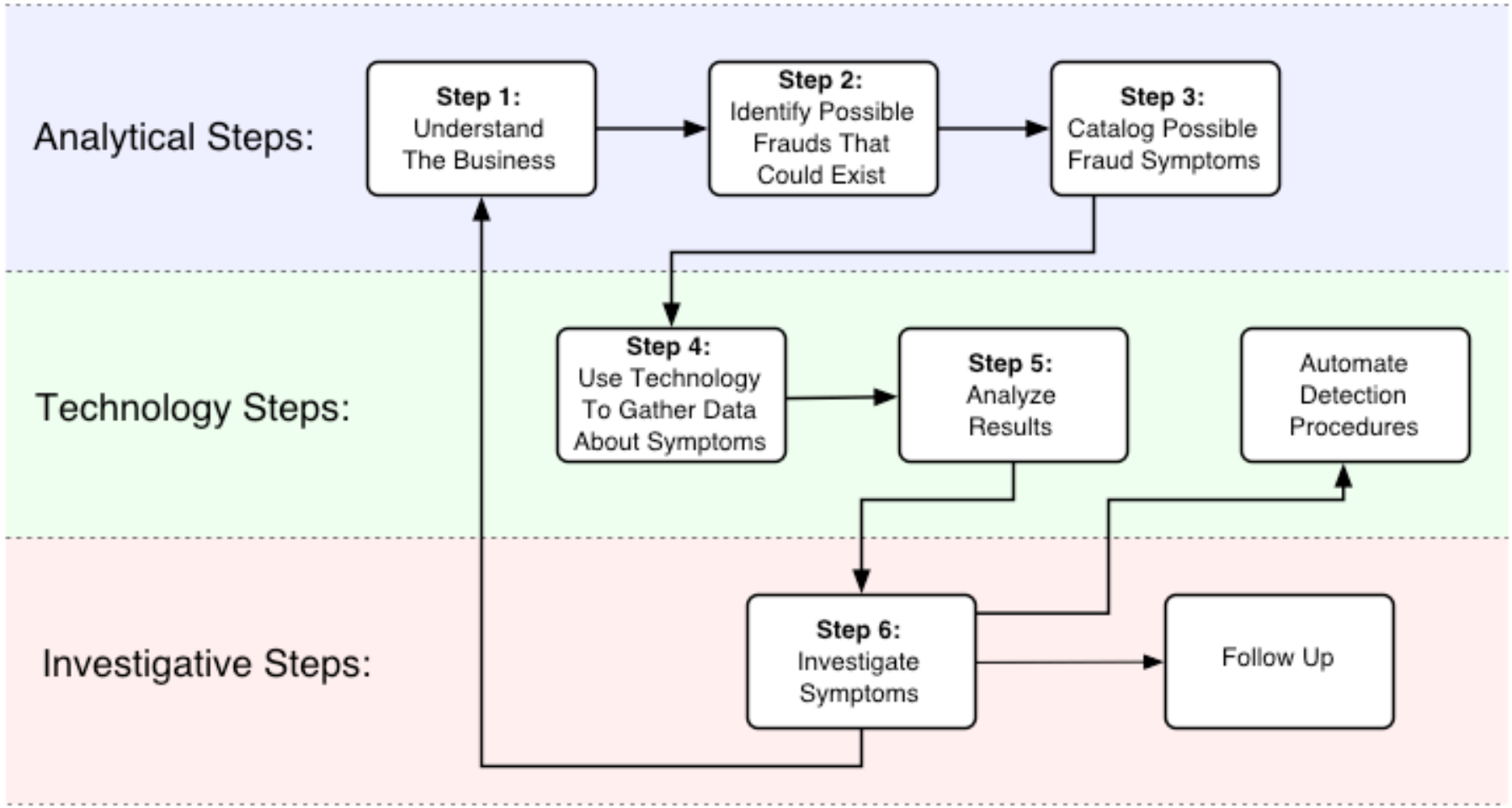
Focus on People

- Why focus on people?
- What tools are required?
- What skills are required?
- What experiences have you had with people-focused detection?
  - Advantages? Disadvantages?

Focus on Transactions

- Why focus on transactions?
- What tools are required?
- What skills are required?
- What experiences have you had with transaction-focused detection?
  - Advantages? Disadvantages?

Overview


Analytical Steps:
Step 1: Understand The Business
Step 2: Identify Possible Frauds That Could Exist
Step 3: Catalog Possible Fraud Symptoms
Technology Steps:
Step 4: Use Technology To Gather Data About Symptoms
Step 5: Analyze Results
Automate Detection Procedures
Investigative Steps:
Step 6: Investigate Symptoms
Follow Up

Step 1: Understand the Business

- Include an experienced business employee on detection team
- Tour the business, department, or plant
- Become familiar with competitor processes
- Interview key personnel
- Analyze financial statements
- Work with auditors/security personnel

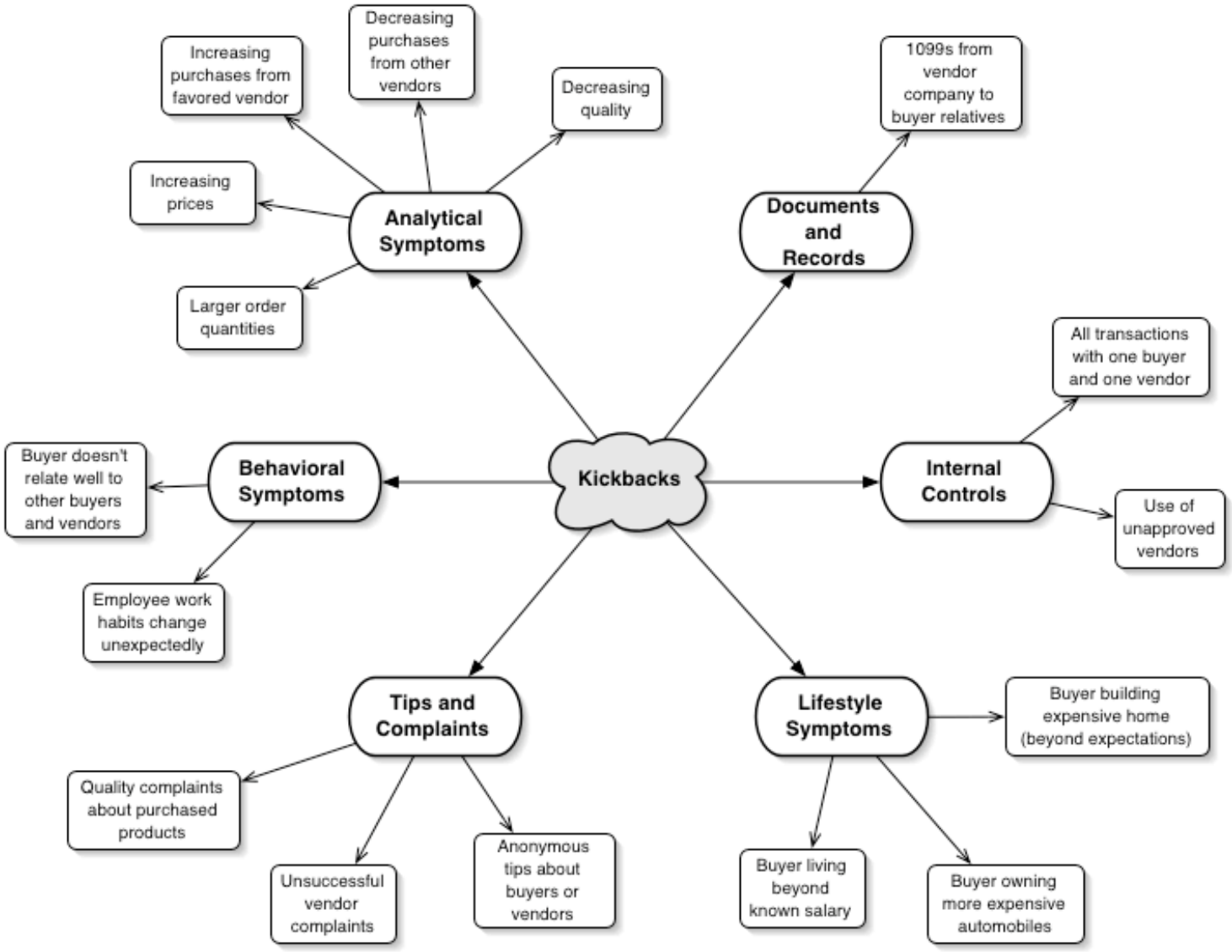
Step 2: Identify Possible Frauds that Could Exist

- Divide business unit into individual functions
- Determine the players
- Determine types of interactions between insiders and outsiders
- Ask questions such as:
  - How could employees commit fraud alone?
  - How could vendors commit fraud alone?
  - How could vendors/employees collude?
- Develop a laundry list of possible frauds specific to this business unit

Step 3: Catalog Possible Fraud Symptoms

- Analytical anomalies
- Document or record symptoms
- Internal control symptoms
- Lifestyle symptoms
- Behavioral symptoms
- Tips and complaints

Step 3: Catalog Possible Fraud Symptoms



Step 4: Use Technology to Gather Data About Symptoms

- Most data comes from corporate databases
- Create custom data warehouses to store data

Step 5: Analyze and Refine Results

- Analyze using time algorithms, statistical queries, etc.
- Conduct iterative runs to hone results

Step 6: Investigate Symptoms

- Use computer-based analyses for efficiency
- Work with auditors and/or security personnel
- Refine algorithms and queries from steps 4 and 5

Additional Activities—After Process

- Follow-up on suspected frauds
- Automate detection procedures
  - We'll talk later about automation
- Use lessons learned to cycle through the process again
  - *This is the most important part of the process!*
  - *Queries achieve increased power as they are honed through time*
  - *Repeated runs also provide economies of scale*

Example

- Large Oil Refinery
- Two Databases: One transactional and one relational
- Risks
  - "Old-boy" networks
  - Union
  - Lower-income workers

Contractor Validation Tests

- Common Names of Contractors
- Dunn & Bradstreet Lookups
- Contractors & Employees with same phone numbers or addresses
- Contractors used but not approved

General Contractor Tests

- Adjustments to invoices after approval
- Contracts with only one buyer
- Contracts with only one signer
- Contracts with only one requester
- Contractors with rising costs, coupled with rising usage

Equipment Tests

- Equipment $ / Invoice $ by contractor
- Equipment $ / Invoice $ by supervisor
- Equipment charges with no labor charges
- Contractor equipment rates vs. average equipment rates (across all contractors)

Labor Tests

- Employees with jumps in labor rates
- Contractors rates per hour vs. average rates for each craft
- Contractors with rising overtime charges
- Employees with high overtime/timecard
- Invoices with outrageous rates per hour
- Number of employees in each craft, by contractor
- Contractors with outrageous rates per hour

Paper Trail Tests

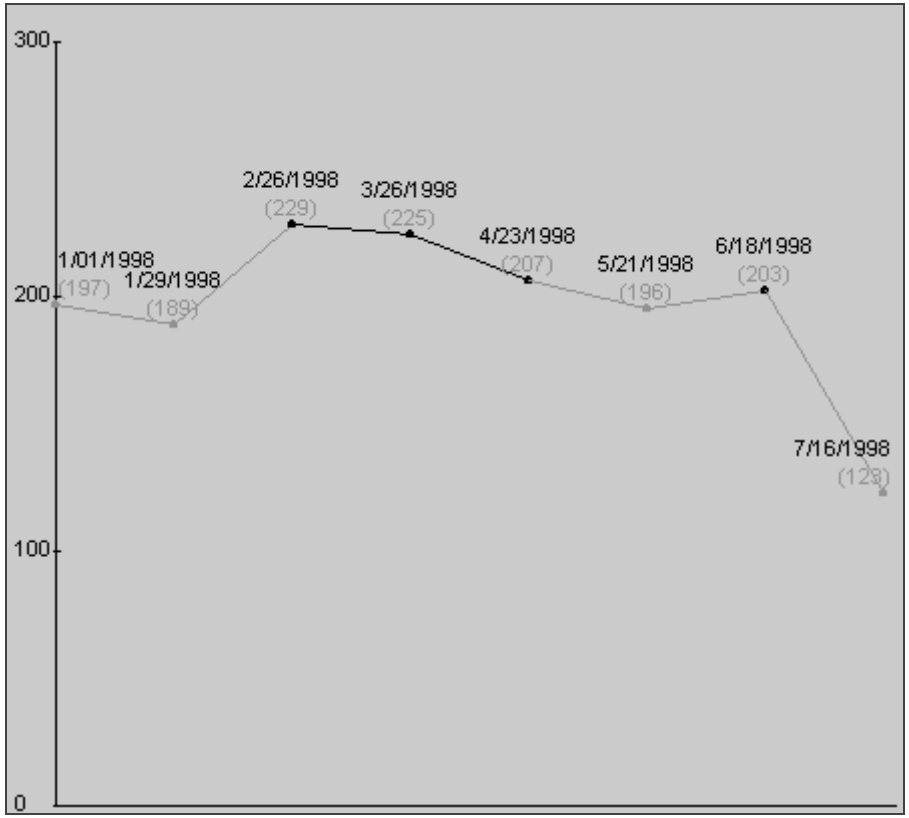
- Duplicate invoice #'s
- Sequential invoice #'s
- Matching of invoice amounts with Benford's law
- Invoices total vs. amount paid
- Invoices with cost overruns (defined by work order expected amounts)
- Misc Charges Total Charges per invoice

Specialized Tests

- Used computer queries to follow up on anonymous tips and other information
- Searches validated/investigated the tip that was given

Superhuman Workers

- Summed all hours (normal, OT, DT) per two week period, regardless of invoice or timecard)
- Workers were logging hours on two timecards for simultaneous jobs



The Family Business

A	B	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM
AUTHORIZ	AUTHORIZ	A	B	C	D	E	F	G	H	I	J
6/1/92	11/28/92										
11/29/92	5/28/93	0		0			612.07				0
5/29/93	11/25/93						181825.8				
11/26/93	5/25/94						218074.6	292.52			
5/26/94	11/22/94						521771.7		50.51		
11/23/94	5/22/95						255223.7				
5/23/95	11/19/95					234775	309829.5			215.36	
11/20/95	5/18/96						597202.5				
5/19/96	11/15/96						110310.9				
11/16/96	5/15/97				64717.92		1557406				
5/16/97	11/12/97		9322.57				196015.7				0
11/13/97	12/9/97										

Work Orders Authorized By Purchaser

The Family Business

A	B	I	J	K	L	M	N	O	P	Q	R
INVOICE_I	INVOICE_I	A	B	C	D	E	F	G	H	I	J
1/18/93	7/17/93						976.3	1052			
7/18/93	1/14/94						18188.62	1940.25			64.68
1/15/94	7/14/94	1658.9									
7/15/94	1/11/95						12104.95			1500	
1/12/95	7/11/95						10885.3				
7/12/95	1/8/96					2178	78661				
1/9/96	7/7/96		744			1563.21	27905.65		160		
7/8/96	1/4/97						42551			2400	
1/5/97	7/4/97				600		88264.75				
7/5/97	12/11/97			3040			3480				

Invoice Charges Authorized By Purchaser

The Family Business

A	B	AG	AH	AI	AJ	AK	AL	AM
AUTHORIZ	AUTHORIZ	A	B	C	D	E	F	G
6/1/92	11/28/92							123614.77
11/29/92	5/28/93							80256.39
5/29/93	11/25/93				181825.83			
11/26/93	5/25/94				80577.04	752.58	94121.46	
5/26/94	11/22/94		6341.33	5500	1755850.07			
11/23/94	5/22/95	9505.69			2683084.13			
5/23/95	11/19/95			68010.59	341903.74		421286.94	
11/20/95	5/18/96				597202.51			
5/19/96	11/15/96				252600.9			
11/16/96	5/15/97				1557406.18			
5/16/97	11/12/97							
11/13/97	12/9/97							
Totals:		$9,505.69	$6,341.33	$73,510.59	$7,450,450.40	$ 752.58	$515,408.40	$203,871.16

Work Orders Given To Contractor Crew

The Family Business

- Tip stated that kickbacks were occurring with a certain company
- We researched the company and determined which purchaser authorized the work
- A contractor crew and company purchaser were family

Proactive Transaction Analysis

- So proactively focusing on transactions is an effective method,

- How do we do it?
- What skills are required?
  - Napoleon Dynamite:
    - Nunchuck skills
    - Computer hacking skills
    - Bow hunting skills

Step 1: Understand the Business

- Business skills
- People skills
- Accounting skills
- Strategy skills
- Interviewing skills
- A good business background and experience provides these skills

Steps 2 + 3

- Knowledge of schemes
  - Who
  - What
  - Where
  - How
- Knowledge of indicators
  - Red flags
  - How to interpret multiple indicators
- Most CFE courses focus on these steps

Step 4: Use Technology to Gather Data About Symptoms

- Data Access
  - Database skills
  - Text file manipulation
  - Data massaging and preparation
  - How to work with IT people
- Internet-based Resources
  - Internet searching
  - Knowledge of available web sites

Steps 5 and 6

- Data Analysis
  - Descriptives
  - Statistical routines
  - Text analysis skills
  - Specific fraud detection routines
  - Trend analysis skills
  - Scripting for repeated analysis
- Investigation Skills

Software for Data Manipulation

- Basic
  - Microsoft Excel
  - Microsoft Access
- Auditing software
  - ACL
  - IDEA
- Fraud detection software
  - Picalo