

**MIS 3534 Fall 2016 –  
Strategic Management of  
Information Technology  
*Week 5 – Business Value of IT (I)***

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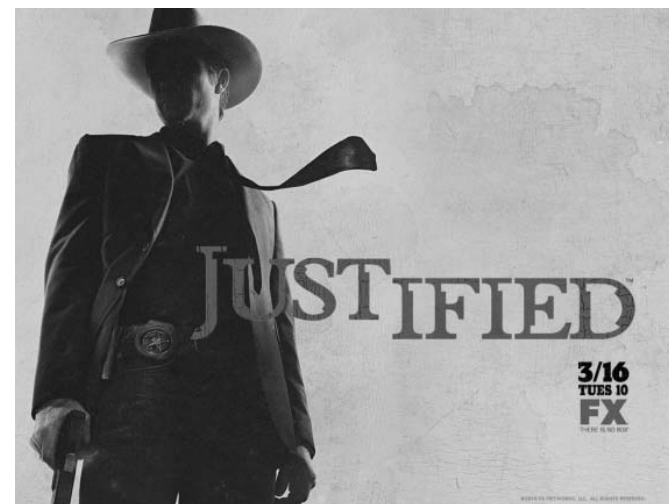
***Oct. 3<sup>rd</sup>, 2016***

## Today, we will discuss ...

- How to justify a substantial amount of IT spending in an organization?
- What kind of business value can IT generate for a business organization?

## How to Justify e\*Logistics & Digital Platform?

- Try to guess – How much do you think Otis and Trinity have spend in e\*Logistics and Common Digital Platform?
- How can we *justify* such a large amount of investments?
- As a CIO, how would you answer this question from your bosses – *why do we have to throw that much money?*



<http://bluegrasstoday.com/gangstagrass-on-justified-tonight/>

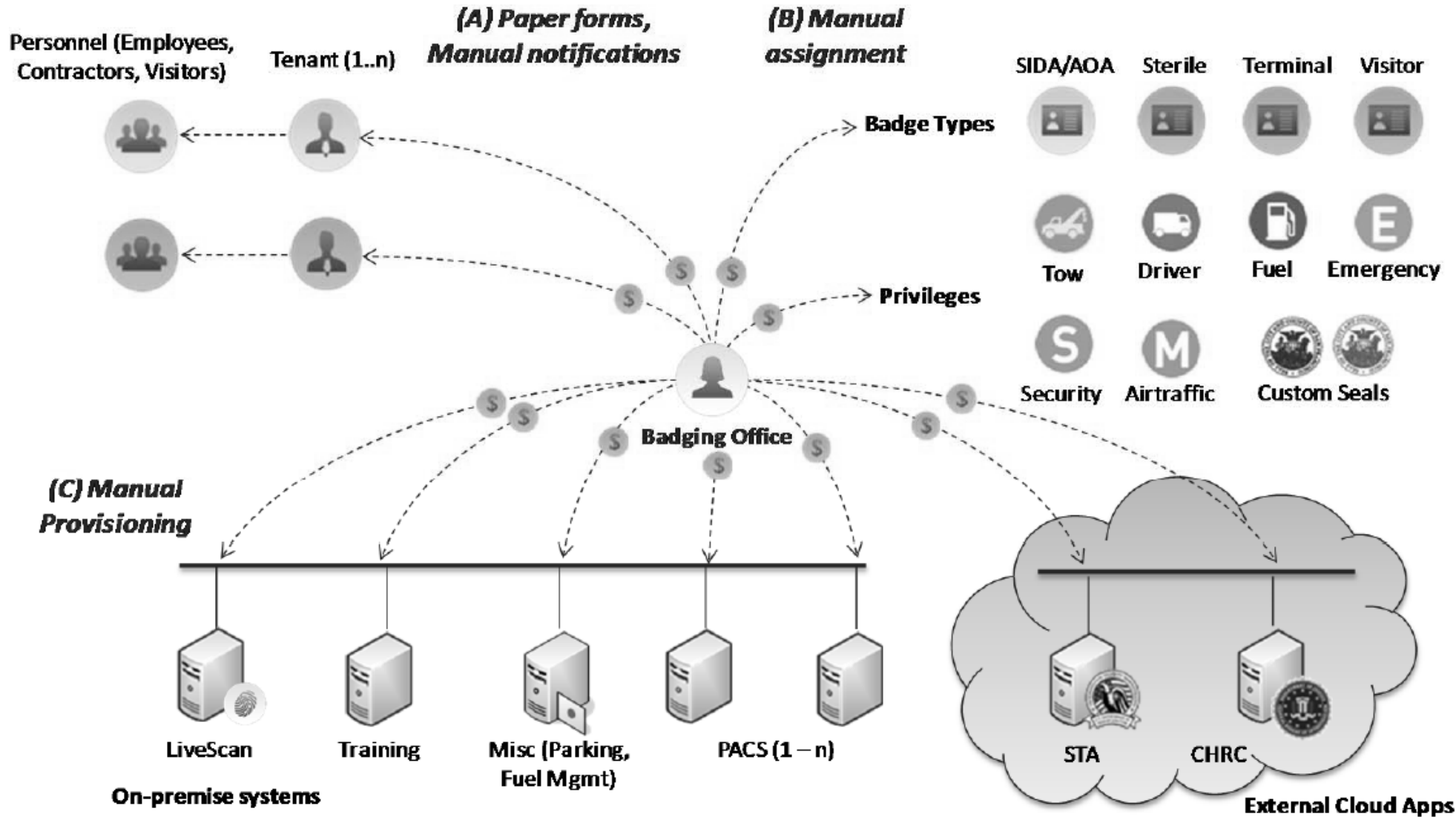
# Physical Security Management at Airport (1/2)

- Why is security a concern at an airport?
- Which individuals should an airport manage for security?
  - everyone who works at the airport
  - airport employees, retail employees, airline employees, government officials, contractors, and others

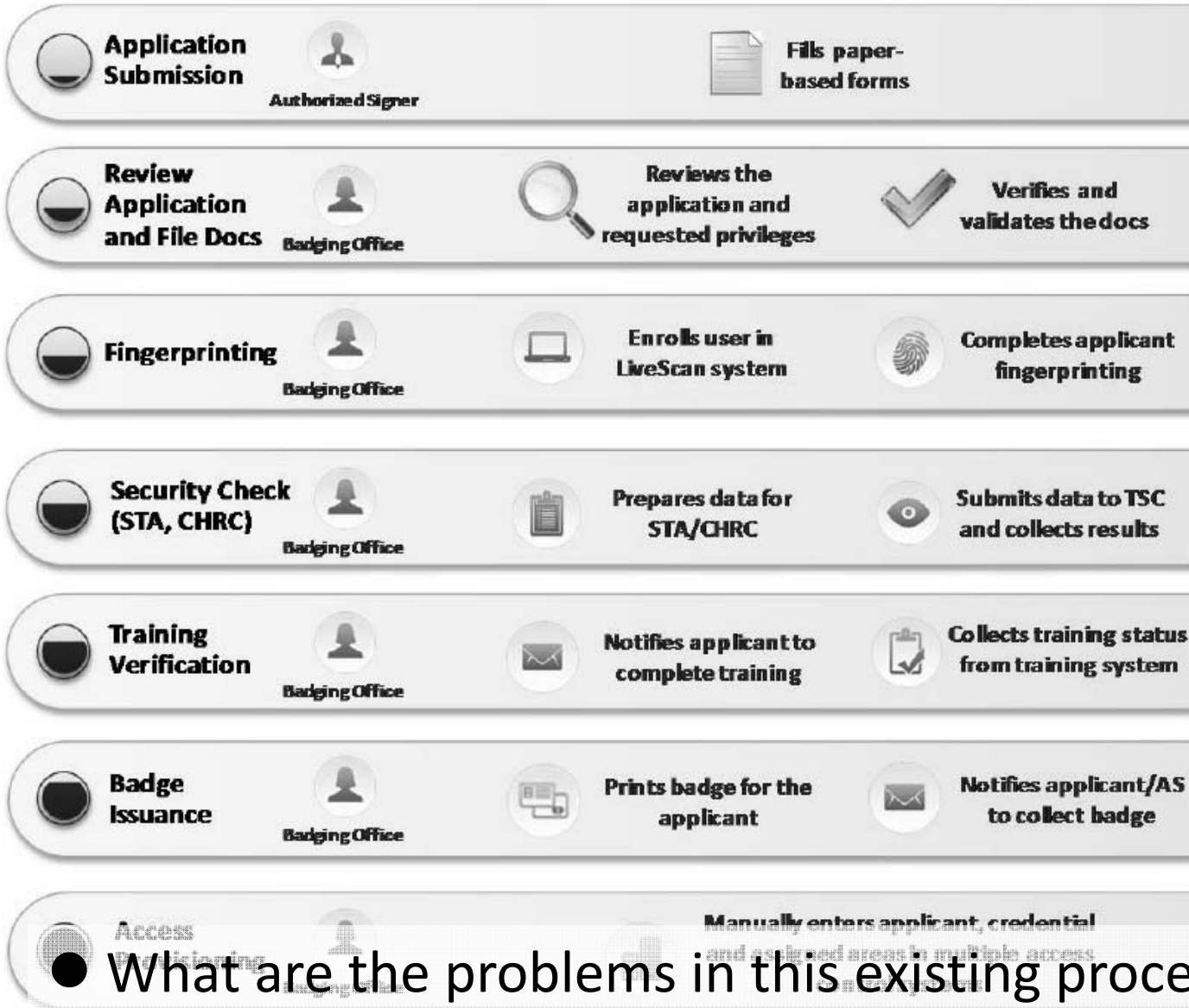
## Physical Security Management at Airport (2/2)

- Which information does a security system have to maintain?
  - Personnel information
  - Security clearance information (who can enter where and can do what?)
- Which process does the security system have to handle?
  - Adding, deleting, and updating personnel and clearance information
  - Information exchange with external systems
  - Tracking and auditing

# Current SFO Security Management Process



Manual processes currently implemented through paper-based forms and through multiple systems



- Data entry errors
- Data re-entry, Manual verification
- Duplicate records
- Limited tracking/audit
- Delays
- Data re-entry
- Data entry errors
- Data re-entry, Manual verification of results
- Manual determination of required clearances
- Manual notifications and delays
- Manual verification of results
- Manual notifications, delays and applicant authentication
- Manual check of pre-requisites completion
- Data entry errors – unauthorized access
- Data re-entry into multiple PACS

● What are the problems in this existing process?

## **Risk in the Current Security System (1/3)**

- What are the risks in the current security system at SFO?
- What are the risks from the current manual, inefficient processes in managing airport employee credentials?
  - in adding a new employee?
  - in updating employee credentials?
  - in deleting an employee who resigned or was dismissed?
  - An employee who was fired might still carry badges after he/she was dismissed.



## Risk in the Current Security System (2/3)

The disjointed execution of these processes—which were often conducted out of sequence and required additional resources for correction—undermined airports’ operational efficiency. (See **Exhibits 1 and 2.**) For example, one large international airport took three weeks to register an employee in the parking, payroll, human resources, and PACS databases. “You’d go stand in this huge line, and you’d get to the front of the line, and they would say, ‘This isn’t right, come back Tuesday to fill out new forms,’” said Ajay Jain, president and CEO of Quantum Secure, a provider of enterprise-wide security software solutions. “The wait was so long that people were starting to leave and just abandon these job offers, thereby creating heavy strain on airport operations.”<sup>3</sup>

The challenges did not end once a new employee was registered in the systems—any changes to access permissions required that a massive spreadsheet be printed and compared to the list used at an access point to identify any additions, deletions, or modifications. This inefficient, highly manual, and error-prone process had been the status quo in the physical access control world for decades, but development of comprehensive software solutions offered the prospect of integrating and streamlining existing procedures.

## Risk in the Current Security System (3/3)

- What could be the *WORST-CASE* scenarios?
  - An airplane crash with massive casualties
  - Another 9-11
  - How likely is it?
  - Can we ignore it? Can't we just say "that's not gonna happen"?
  - Can we prevent all possible scenarios?

## Net Present Value (NPV)

- The sum of the present values of net cash flows in multiple periods up to time  $T$

$$NPV = \sum_{t=0}^T \frac{R_t - P_t}{(1+i)^t}$$

- $R_t$  : Cash inflows or savings at time  $t$
- $P_t$  : Cash outflows (payments) at time  $t$
- $i$  : the discount rate (an inflation rate, cost of capital, or an interest rate that the firm pays)
- Reject the project if  $NPV < 0$

## Internal Rate of Return

- The discount rate ( $i$ ) in which the net present value is equal to zero

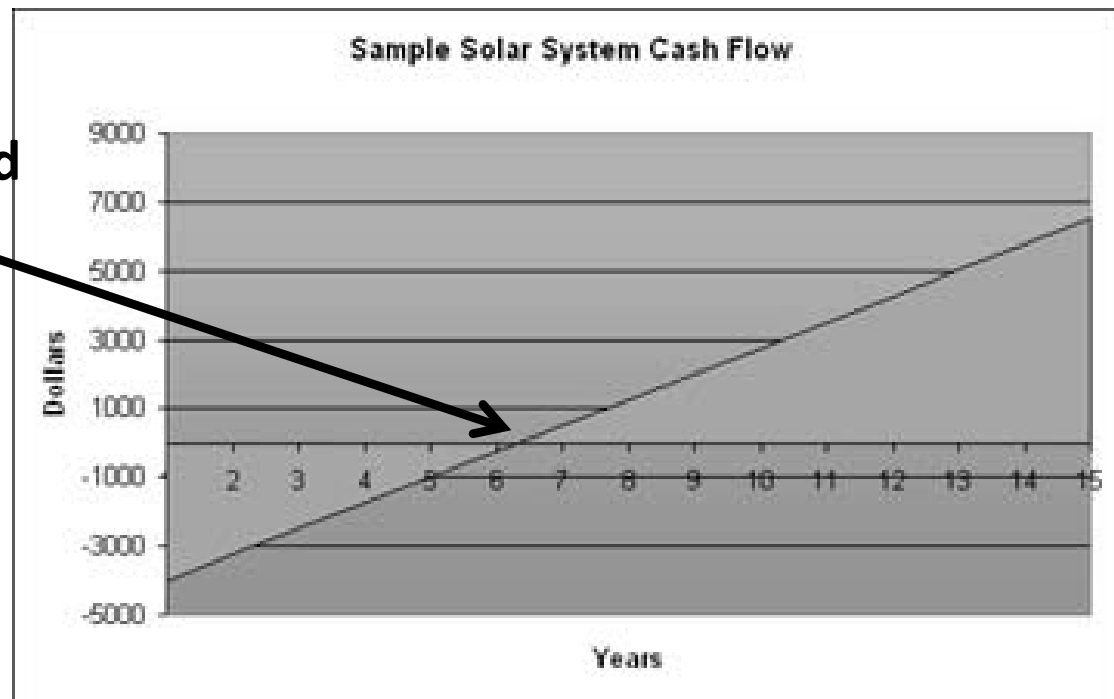
$$NPV = \sum_{t=0}^T \frac{R_t - P_t}{(1+i)^t} = 0$$

- Reject the project if IRR is lower than the cost of capital
  - meaning that it is better to make investments in other projects
- Help compare returns from multiple investment projects

## Payback Period (1/2)

- The time at which cash inflows or savings recoup the entire of initial investments
- The time at which cumulative cash inflows or savings exceed the initial investments

**Payback Period  
= 6.3 years**



<https://www.extension.iastate.edu/AgDM/wholefarm/html/c5-240.html>

# Payback Period (2/2)

**Table 1. Payback Period Analysis of Future Cash Flow Payments for Three Capital Projects**

Year	<u>Project A</u>		<u>Project B</u>		<u>Project C</u>	
	<u>Cash Flow</u>	<u>Cumulative</u>	<u>Cash Flow</u>	<u>Cumulative</u>	<u>Cash Flow</u>	<u>Cumulative</u>
0	-\$1,000		-\$1,000		-\$1,000	
1	\$250	\$250	\$350	\$350	\$500	\$500
2	\$250	\$500	\$350	\$700	\$500	\$1,000
3	\$250	\$750	\$350	\$1,050	\$500	\$1,500
4	\$250	\$1,000	\$350	\$1,400		
5	\$250	\$1,250	\$350	\$1,750		
6	\$250	\$1,500				
7	\$250	\$1,750				
8	\$250	\$2,000				
9	\$250	\$2,250				
10	\$250	\$2,500				

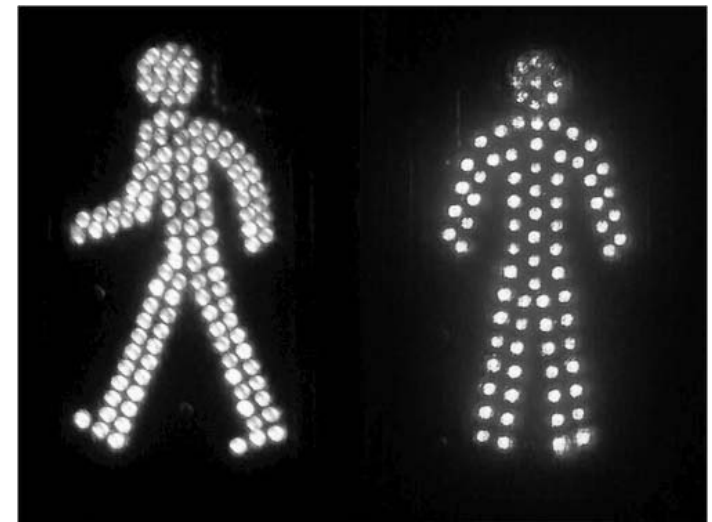
**Payback Period Comparison**

<u>Project</u>	<u>Payback Period</u>	<u>Cash Return</u>
A	4 yrs.	\$2,500
B	3 (2.86) yrs.	\$1,750
C	2 yrs.	\$1,500

$$= 2 + \frac{1,000 - 700}{1,050 - 700} = 2.86$$

## Your Recommendation

- What is your recommendation? Go ahead with this or not?
- How *certain* are you?
  - Are you certain that everything will pan out as predicted?
- Which assumption or prediction is most sensitive (critical)?



<http://www.flickrriver.com/photos/optick/183566072/>

# Sensitivity Analysis

- A ROI analysis hinges on a number of assumptions and predictions.
  - e.g. The number of new users will increase by 10% annually, or the required man-hours for record-keeping will be reduced by 88%.
- There is no guarantee that all the assumptions will be correct.
- Sensitivity analysis: How would predicted returns (NPV, IRR) change when one or more assumed parameters change?
  - to find out to which assumption the predicted returns are most sensitive.



# Problems with ROI Analysis

- What would be the problems with the ROI analysis we just did?
  - What does this fail to account for?
  - Intangible (hard-to-quantifiable) benefits and costs

	A	B	C	D	E	F	G	H
1	<b>San Francisco Airport SAFE Investment Analysis</b>							
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## Intangible or unexpected costs

- What would be intangible (hard-to-quantify) costs?
  - Employee training and adjustment, work disruption
  - Costs in maintaining old and new systems concurrently
- What would be unexpected costs that we need to be mindful?
  - Project delays and cost overrun, system failures
  - Resistance of employees to accept the new system
  - Unidentified security risk in the new system



## Intangible (Soft) benefits

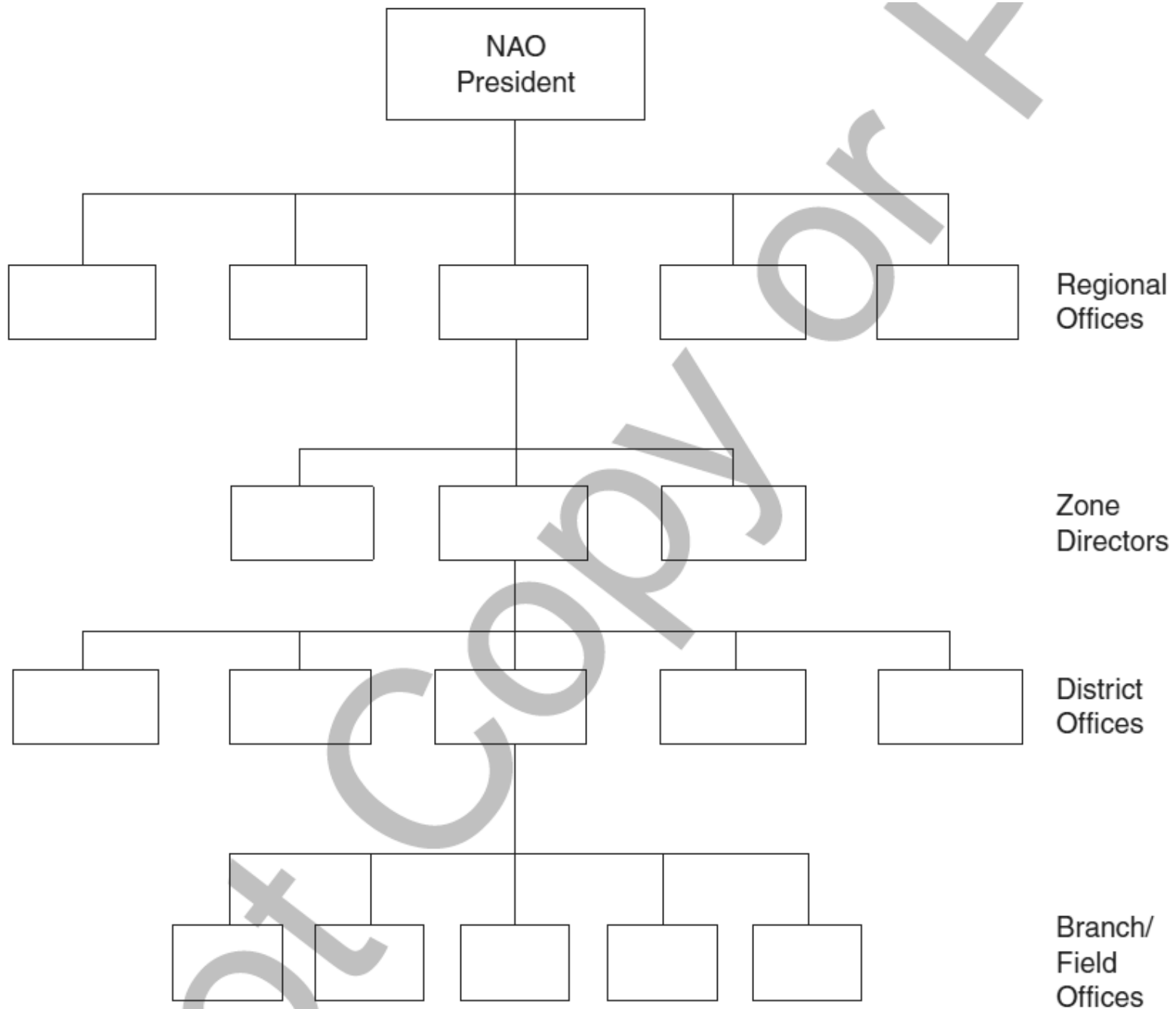
- What would be intangible (hard-to-quantify) benefits?
- How would you quantify benefits from *increased compliance*?  
Based on what?
- How would you quantify benefits from *reduced security risks*?
- How would you make your numbers believable to your bosses?



<http://sourcesofinsight.com/quantification/>

# Intangible (Soft) benefits from OTISLINE

- What would be the intangible (hard-to-quantify) benefits from OTISLINE?
- How to categorize them?



- Regional offices are geographically dispersed throughout North America.
- Zone directors have three to five district managers reporting to them.
- District managers have two to six branch/field offices reporting to them.

# Business Value of OTISLINE

Improved Profits

## FINANCIAL

Increased Service  
Contracts

Increased  
Elevator Sales

## CUSTOMER

Reduced  
Customer Complaints

Reduced  
Contract Cancellation

Improved Satisfaction  
and Relationship  
with Building Owner

Enhanced  
Brand Images  
to Individual Riders

## INTERNAL PROCESS

Reduced  
Response Time

Improved  
Product  
Reliability

More Correct  
Problem  
Diagnosis

Consistency in  
Service Quality

Reduced  
Service Costs

## LEARNING & GROWTH

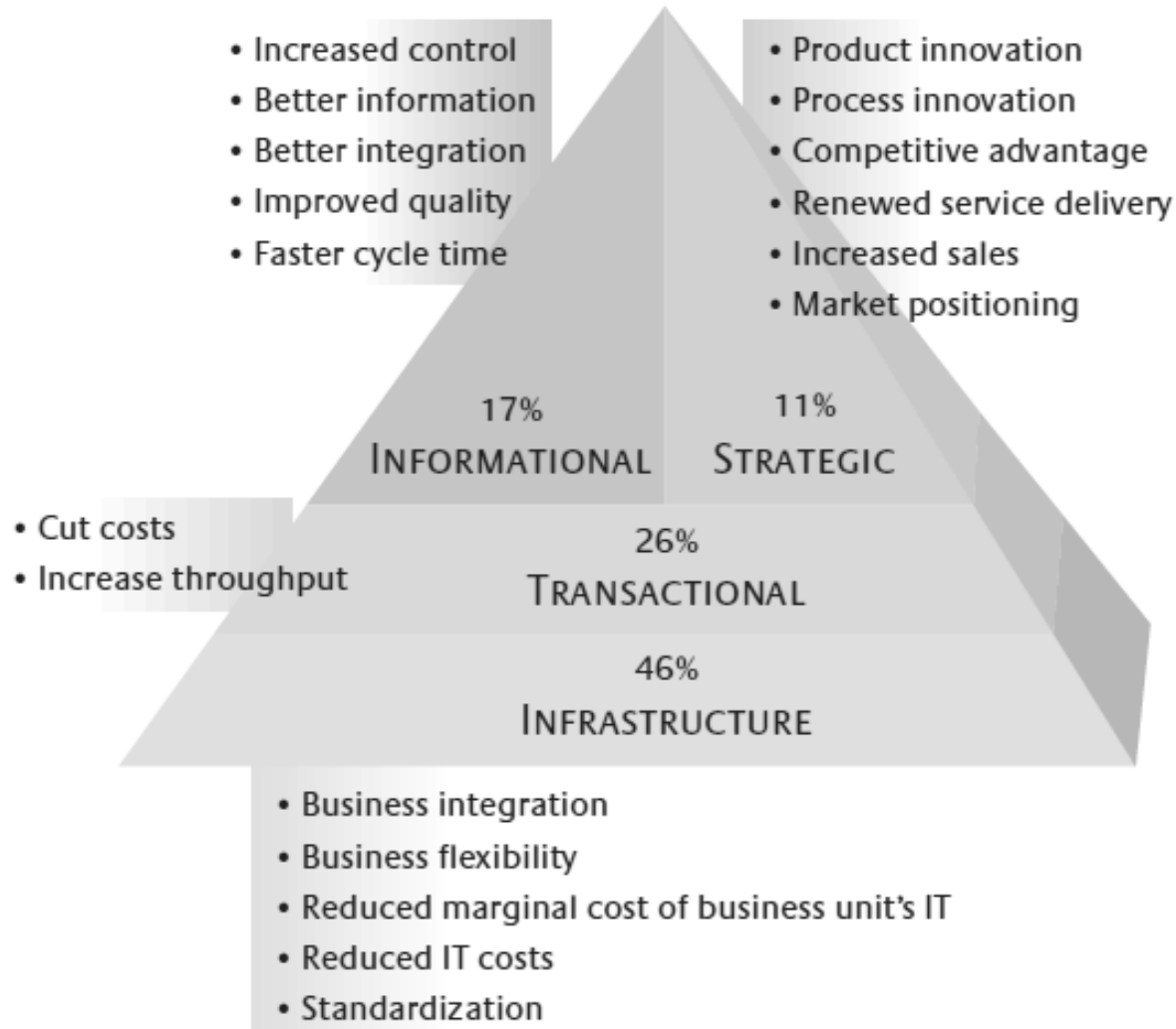
Transparency  
& Communication

Faster  
Decision Making  
& Communication

Flexible  
Employee  
Deployment

Improved  
Employee  
Training

# Business Value from Different IT Categories



Source: Weill, P. and Aral, S. (2006) "Generating Premium Returns on Your IT Investments," MIT Sloan Management Review (47:2)

## IT Asset Category

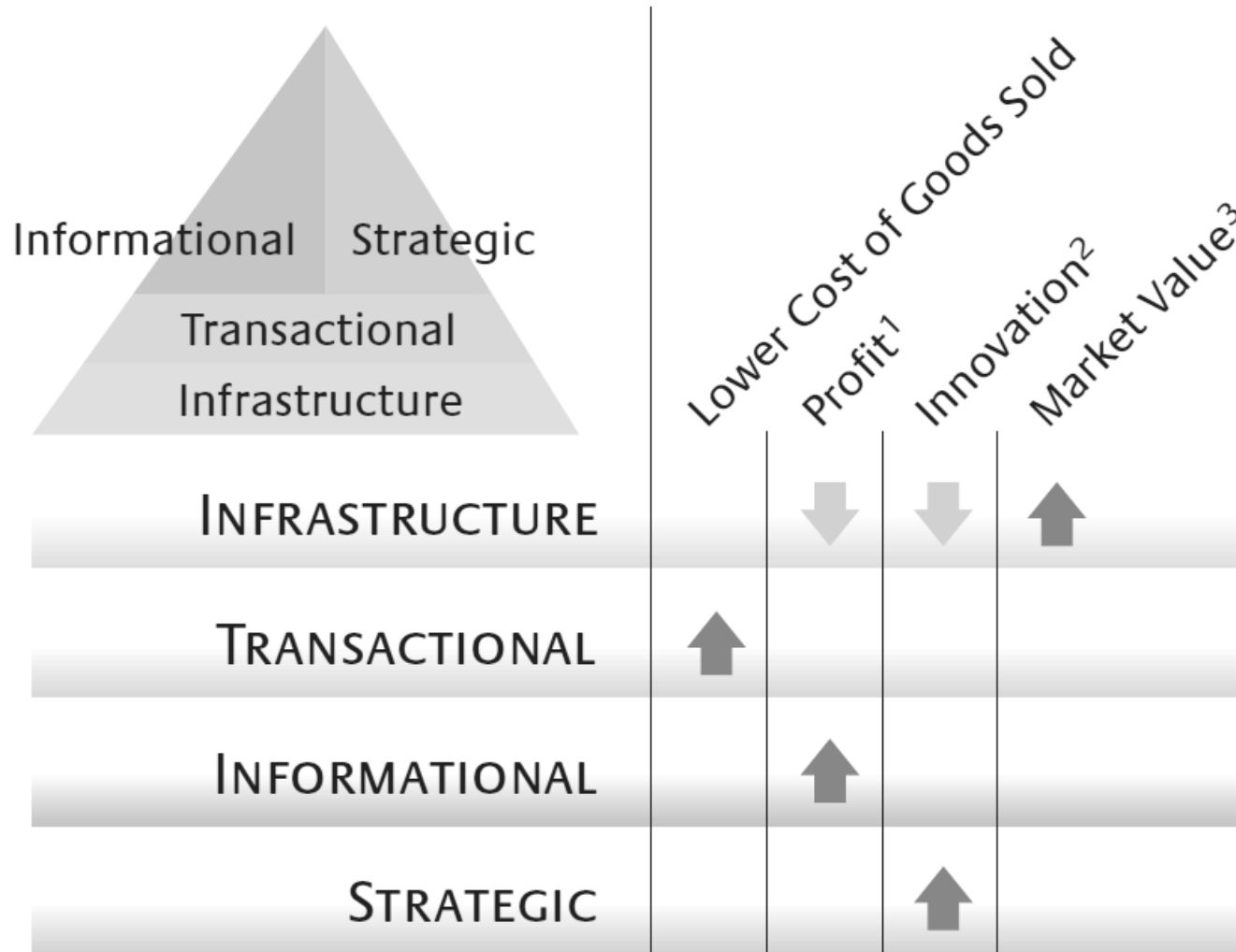
- **Transitional IT** : IT that is primarily used to cut costs or increase throughput for the same cost
- **Informational IT** : to provide information for purposes such as accounting, reporting, compliance, communication, or analysis
- **Strategic IT** : to gain competitive advantages by supporting entry into new markets or by helping develop new product, services, or business processes
- **Infrastructure IT** : the shared IT services used by multiple applications such as servers, network, and databases

Source: Weill, P. and Aral, S. (2006) "Generating Premium Returns on Your IT Investments," MIT Sloan Management Review (47:2)



## Different IT Assets Deliver Different Value

The up and down arrows gauge the average changes in profitability, innovation and market value the year after an IT investment is made. For example, companies that invest more heavily than their competitors in transactional IT have lower costs.



$$^1 \text{ Net Margin} = \frac{\text{Income Before Extraordinary Items}}{\text{Total Sales}}$$

$$^2 \frac{\text{Sales From Modified Products}}{\text{Total Sales}} \text{ and } \frac{\text{Sales From New Products}}{\text{Total Sales}}$$

<sup>3</sup> The Market to Book value of company stock in the same year the investment is made.

Source: Weill, P. and Aral, S. (2006) "Generating Premium Returns on Your IT Investments," MIT Sloan Management Review (47:2)

## **Justification of Business Value of IT**

- Business value and benefits from IT investments are multi-faceted and dynamic.
- A CIO should be able to justify IT's business value
  - not only in terms of easy-to-measure indicators such as efficiency, cost reduction, or product quality
  - but also with hard-to-measure (intangible), long-term factors such as customer satisfaction, brand, or market value.
- A CIO should not overlook strategic values (organizational agility, business flexibility) and innovation.