

**MIS 3534 Fall 2014 –  
Strategic Management of  
Information Technology  
*Day 4 – Business Value of IT***

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## **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 Much are e\*Logistics and ByRequest?

- Try to guess – How much do you think Otis and Wyndham have spend in e\*Logistics and ByRequest?
- 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/>

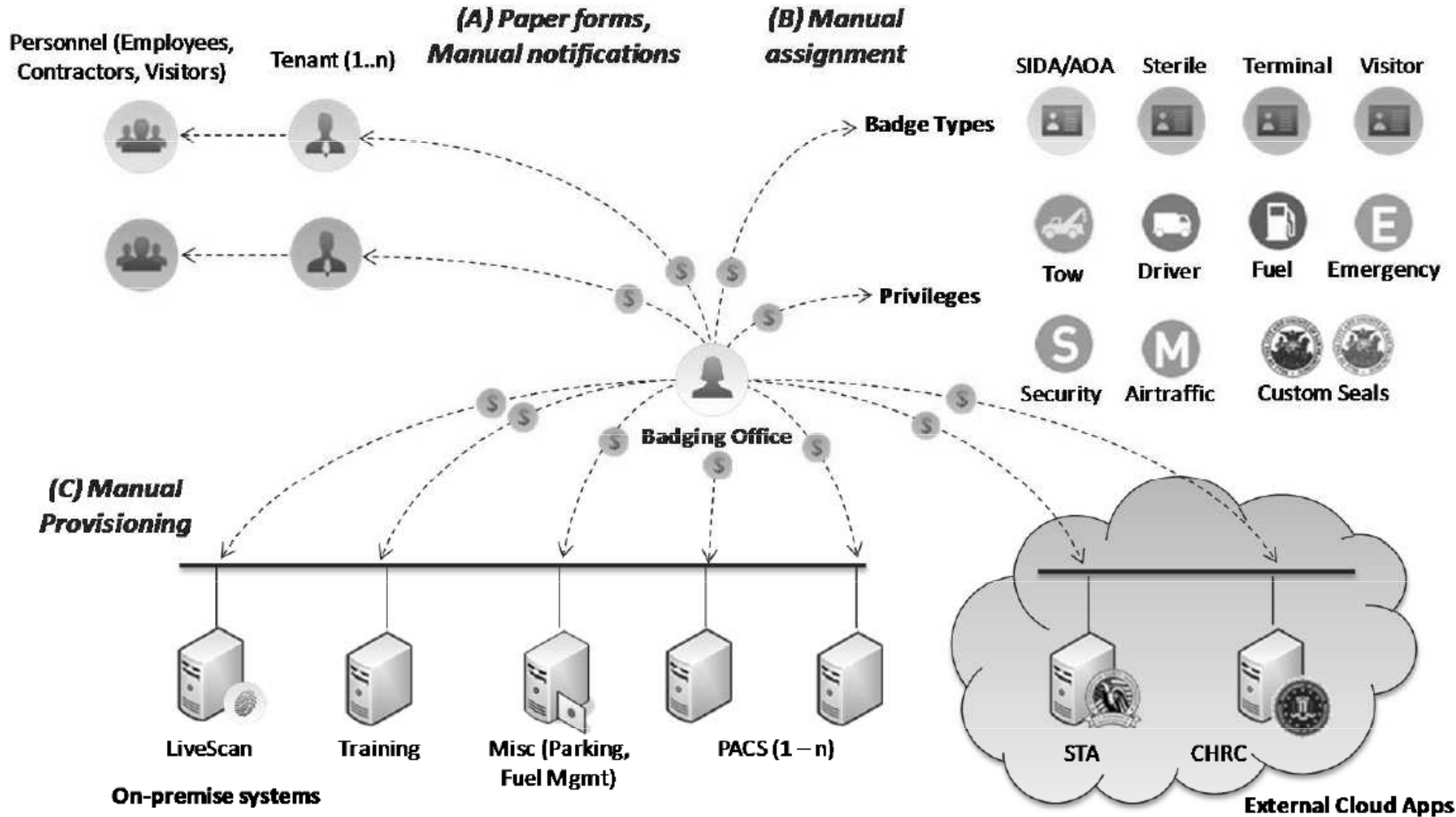
# Physical Security Management at Airport (1/2)

- 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

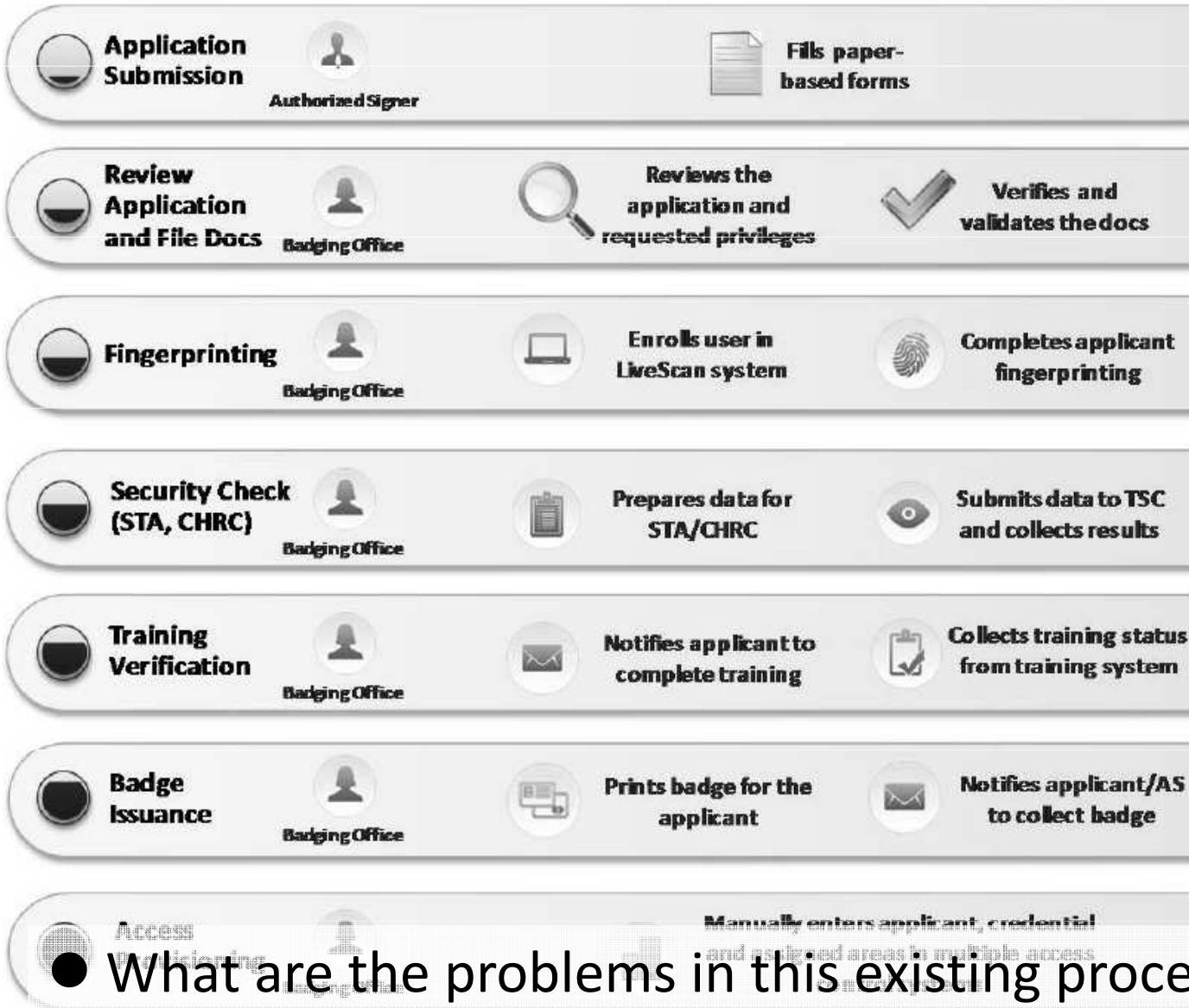
## Physical Security Management at Airport (2/2)

- 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

- What are the risks in the current security system at SFO?
- What could be the *WORST-CASE* scenarios?
  - An airplane crash with massive casualties
  - Another 9-11



## 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

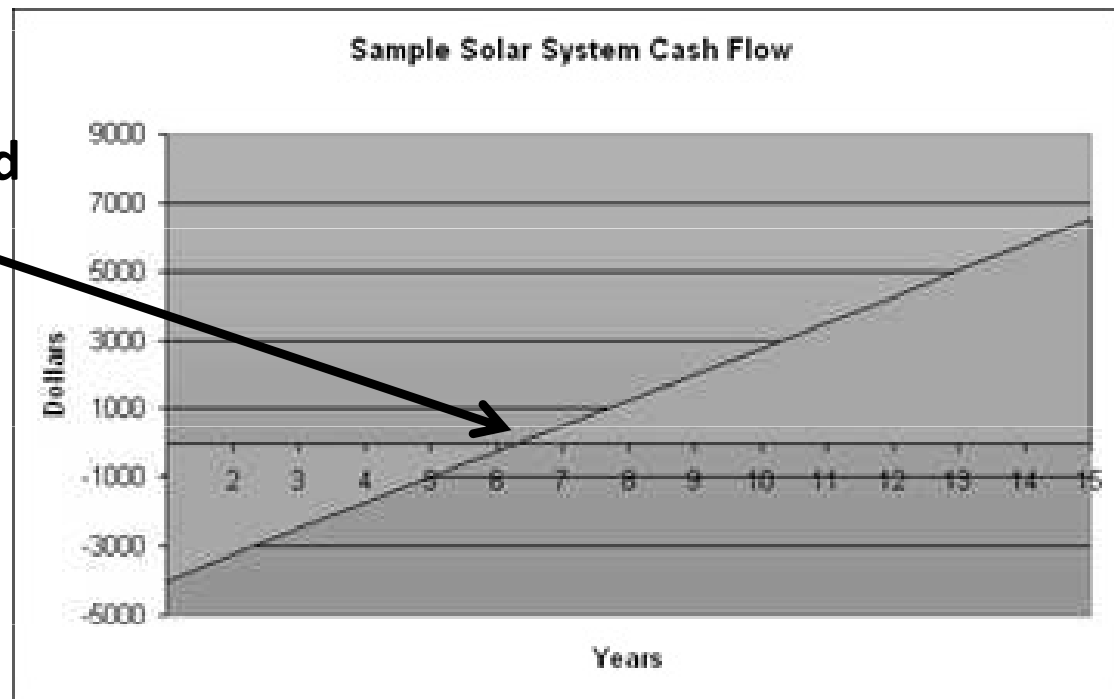
$$NPV = \sum_{t=0}^T \frac{R_t - P_t}{(1+i)^t} = 0$$

- 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**

	<u>Project A</u>		<u>Project B</u>		<u>Project C</u>	
<u>Year</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				

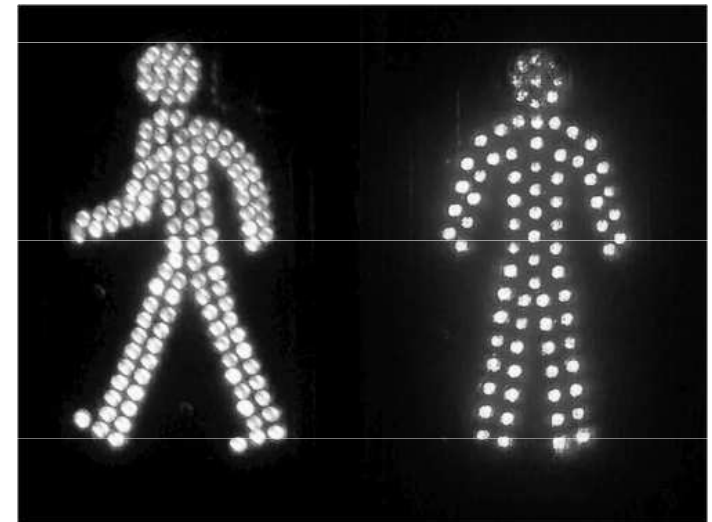
**Payback Period Comparison**

<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>							
2								
3								
4					Year			
5					0	1	2	3
6					2008	2009	2010	2011
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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

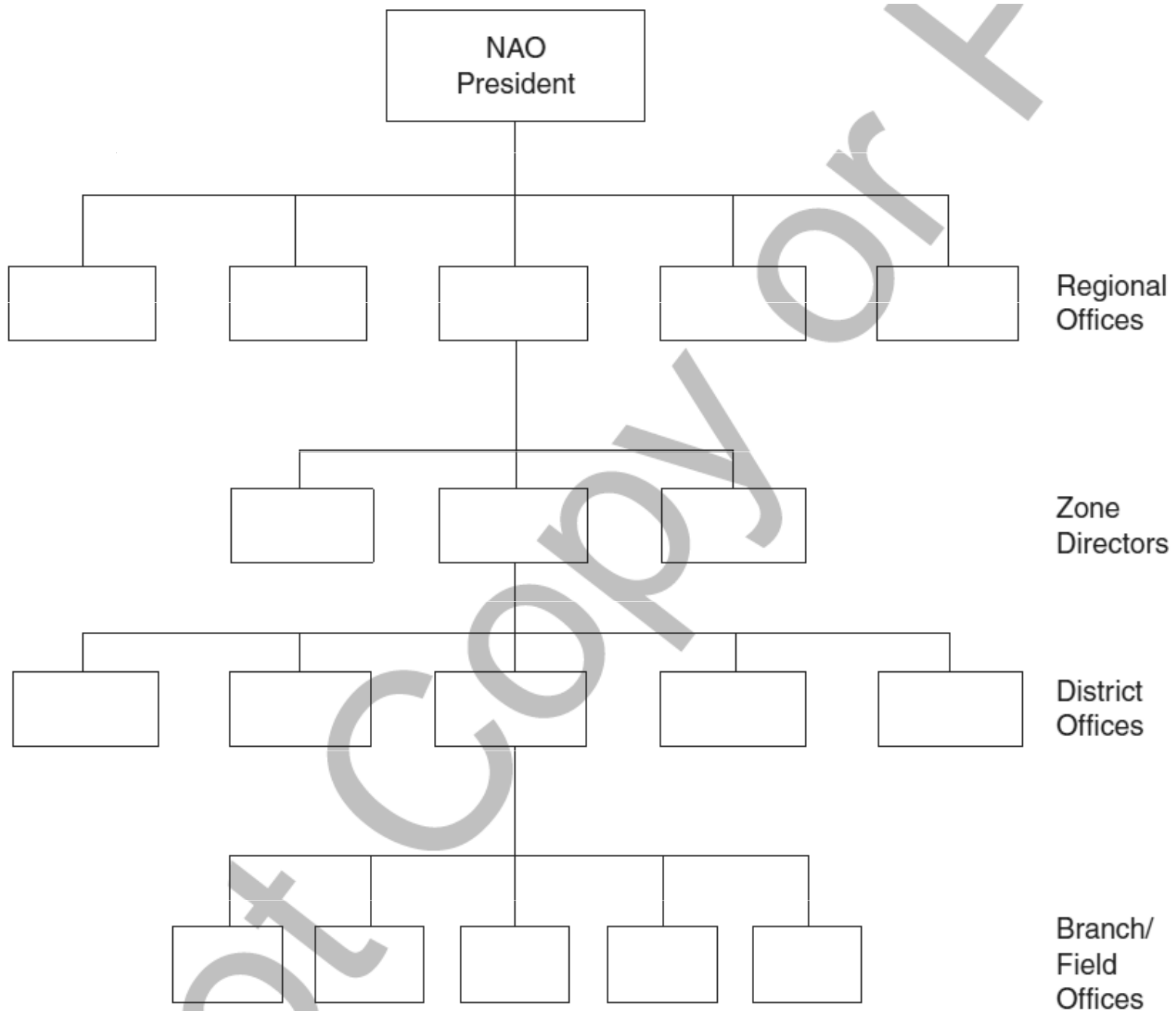
- What would be intangible (hard-to-quantify) benefits?
- How would you quantify benefits from *increased compliance*?  
Based on what?
- How would you quantify benefits from *reduced security risks*?
- How would you make your numbers believable to your bosses?



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

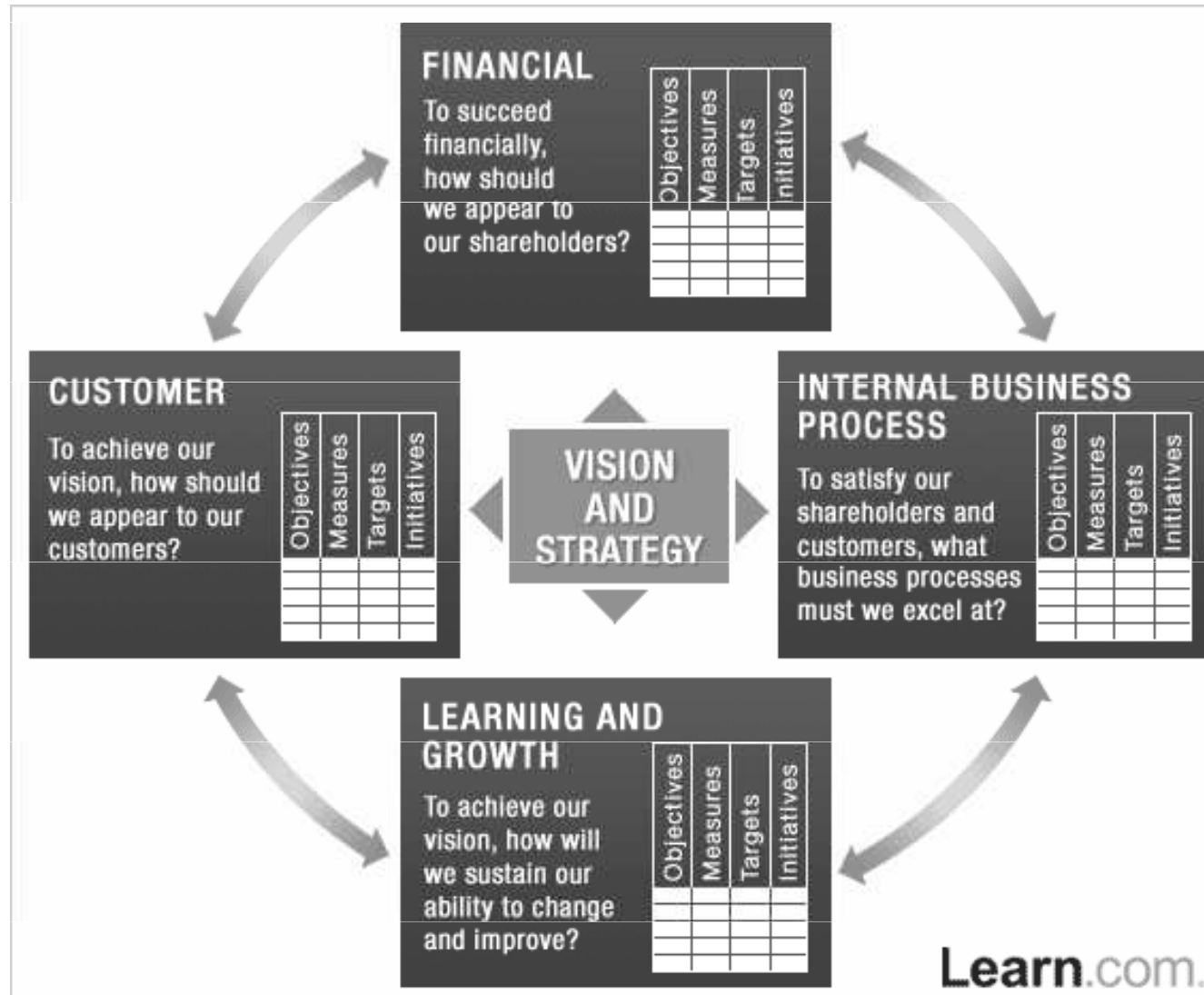
# **Intangible (Soft) benefits from OTISLINE**

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



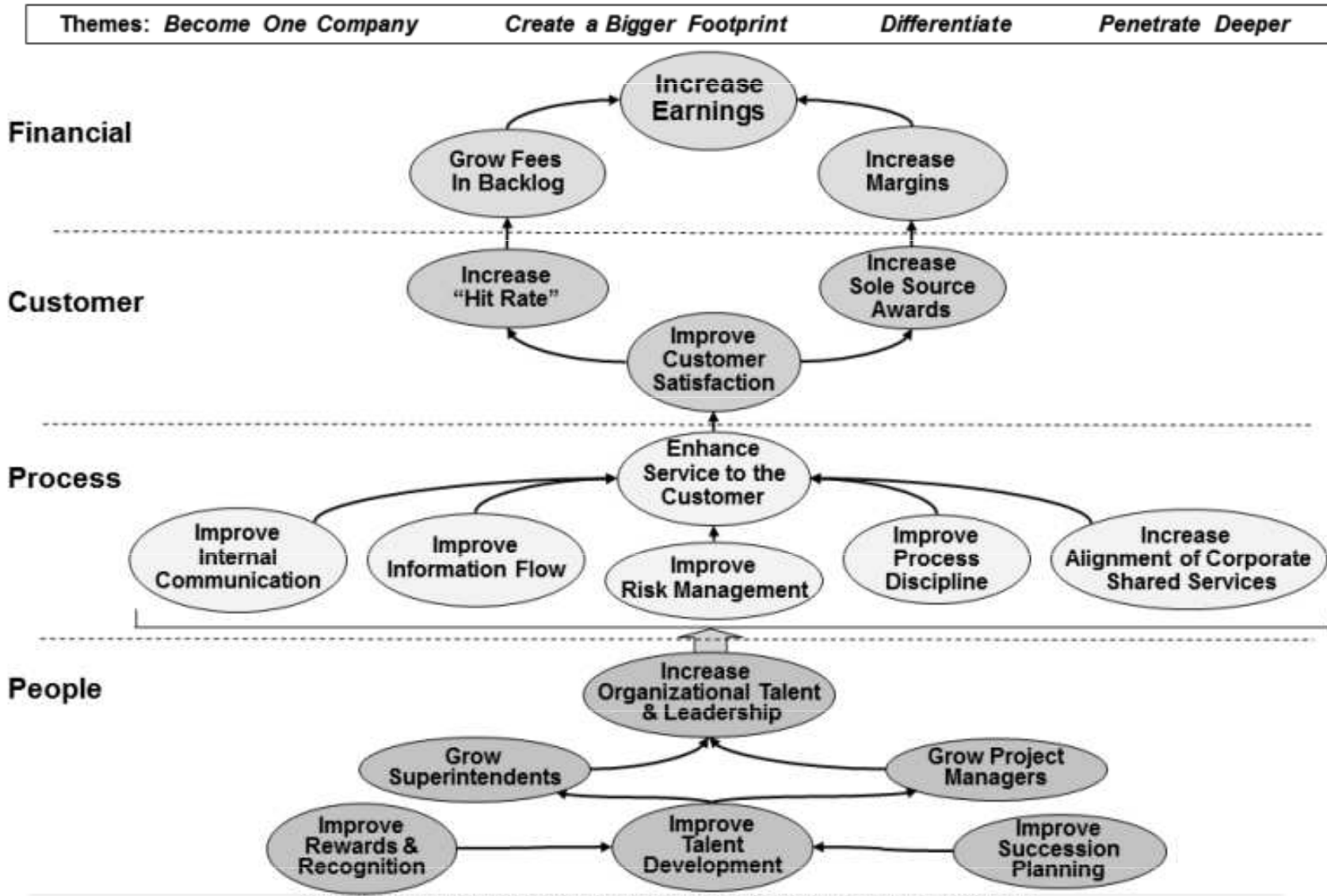
- Regional offices are geographically dispersed throughout North America.
- Zone directors have three to five district managers reporting to them.
- District managers have two to six branch/field offices reporting to them.

# Balanced Score Card (BSC)

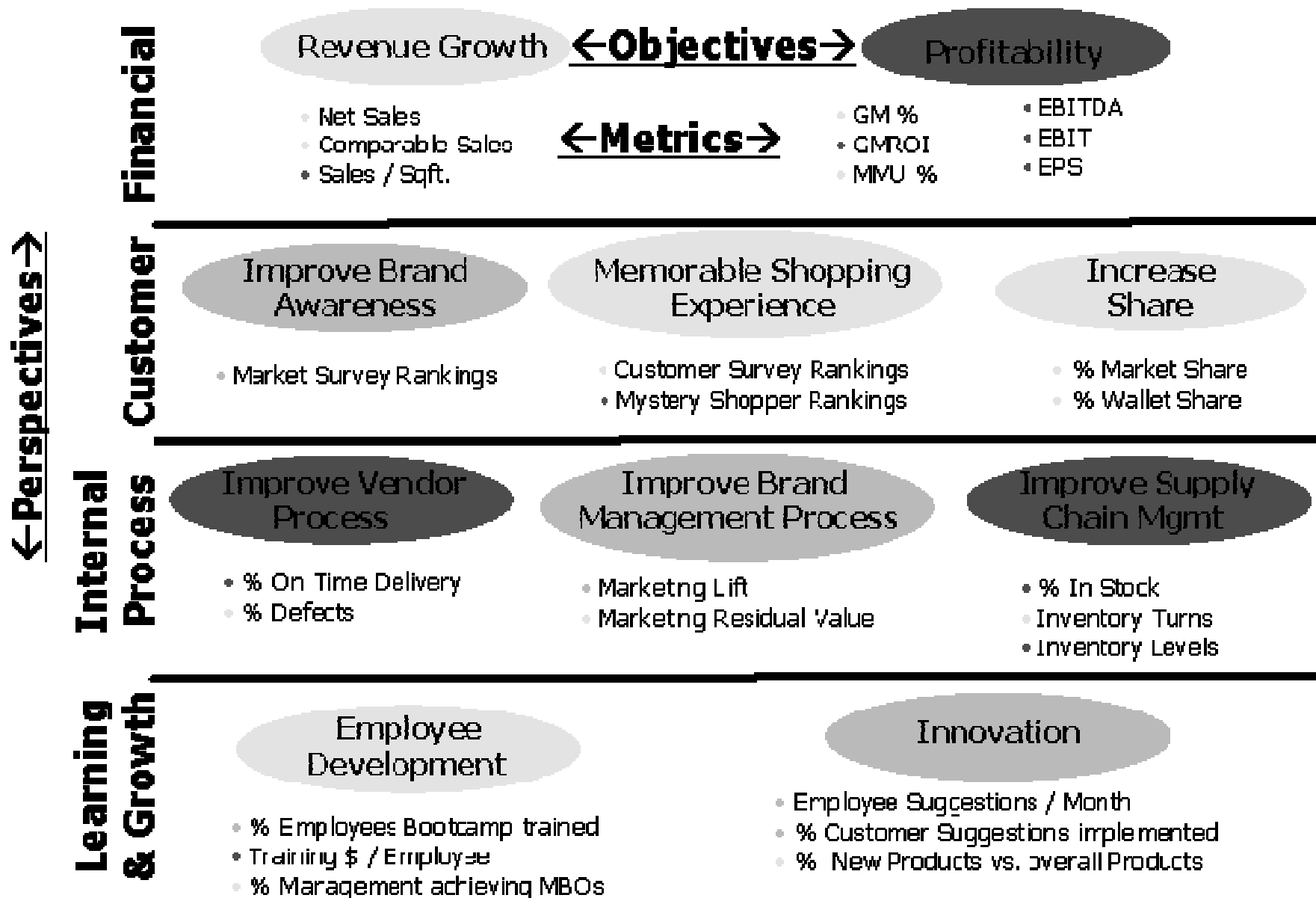


<http://vectorstudy.com/management-theories/balanced-scorecard>

## Construction Company Strategy Map



©2000 - 2011 Balanced Scorecard Institute, a Strategy Management Group company. All rights reserved.



# Example Balanced Scorecard: Regional Airline

**Mission: Dedication to the highest quality of Customer Service delivered with a sense of warmth, friendliness, individual pride, and Company Spirit.**

**Vision: Continue building on our unique position -- the only short haul, low-fare, high-frequency, point-to-point carrier in America.**

Theme: Operating Efficiency	Objectives	Measures	Targets	Initiatives
<b>Financial</b> 	<ul style="list-style-type: none"> <li>• Profitability</li> <li>• Fewer planes</li> <li>• Increased revenue</li> </ul>	<ul style="list-style-type: none"> <li>• Market Value</li> <li>• Seat Revenue</li> <li>• Plane Lease Cost</li> </ul>	<ul style="list-style-type: none"> <li>• 25% per year</li> <li>• 20% per year</li> <li>• 5% per year</li> </ul>	<ul style="list-style-type: none"> <li>• Optimize routes</li> <li>• Standardize planes</li> </ul>
<b>Customer</b> 	<ul style="list-style-type: none"> <li>• Flight is on -time</li> <li>• Lowest prices</li> <li>• More Customers</li> </ul>	<ul style="list-style-type: none"> <li>• FAA On Time Arrival Rating</li> <li>• Customer Ranking</li> <li>• No. Customers</li> </ul>	<ul style="list-style-type: none"> <li>• First in industry</li> <li>• 98% Satisfaction</li> <li>• % change</li> </ul>	<ul style="list-style-type: none"> <li>• Quality management</li> <li>• Customer loyalty program</li> </ul>
<b>Internal</b> 	<ul style="list-style-type: none"> <li>• Fast ground turnaround</li> </ul>	<ul style="list-style-type: none"> <li>• On Ground Time</li> <li>• On-Time Departure</li> </ul>	<ul style="list-style-type: none"> <li>• &lt;25 Minutes</li> <li>• 93%</li> </ul>	<ul style="list-style-type: none"> <li>• Cycle time optimization program</li> </ul>
<b>Learning</b> 	<ul style="list-style-type: none"> <li>• Ground crew alignment</li> </ul>	<ul style="list-style-type: none"> <li>• % Ground crew stockholders</li> <li>• % Ground crew trained</li> </ul>	<ul style="list-style-type: none"> <li>• yr. 1 70%</li> <li>• yr. 4 90%</li> <li>• yr. 6 100%</li> </ul>	<ul style="list-style-type: none"> <li>• Stock ownership plan</li> <li>• Ground crew training</li> </ul>

<http://www.docstoc.com/docs/4580001/balanced-scorecard-examples>

## Key Questions in BSC

- Finance : Through the eyes of the owners of the business, how will they judge financial success?
- Customer : Through the eyes of our customers, how will they judge the value of our products and services? How will we differentiate ourselves in the market?
- Internal Business Process : How can we improve internal processes to improve product, program and service quality, timeliness, economics, and functionality?
- Learning and Growth (or Employee) : How can our employees continuously get smarter, innovative, and improve?



# 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

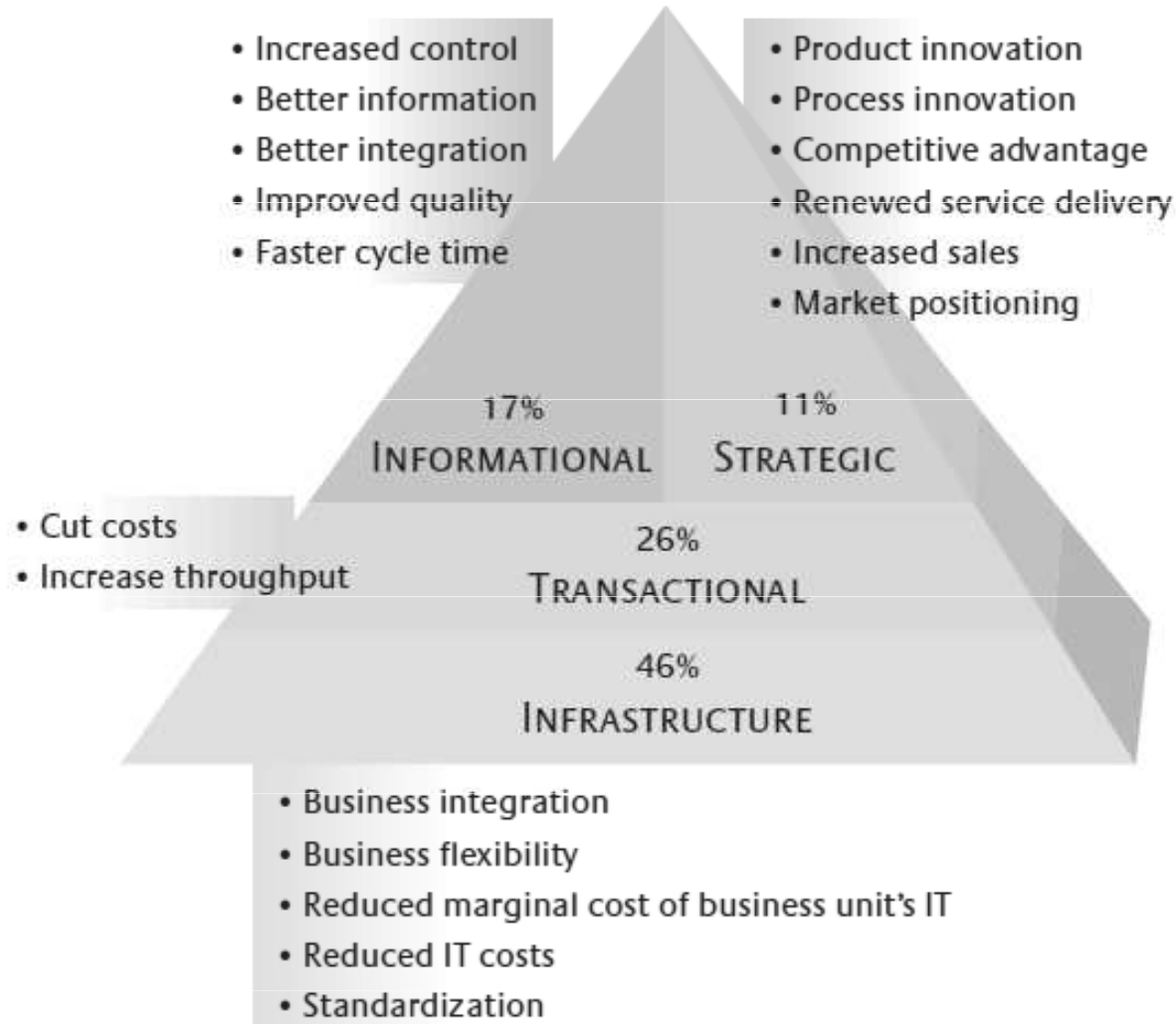
Transparency  
& Communication

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)

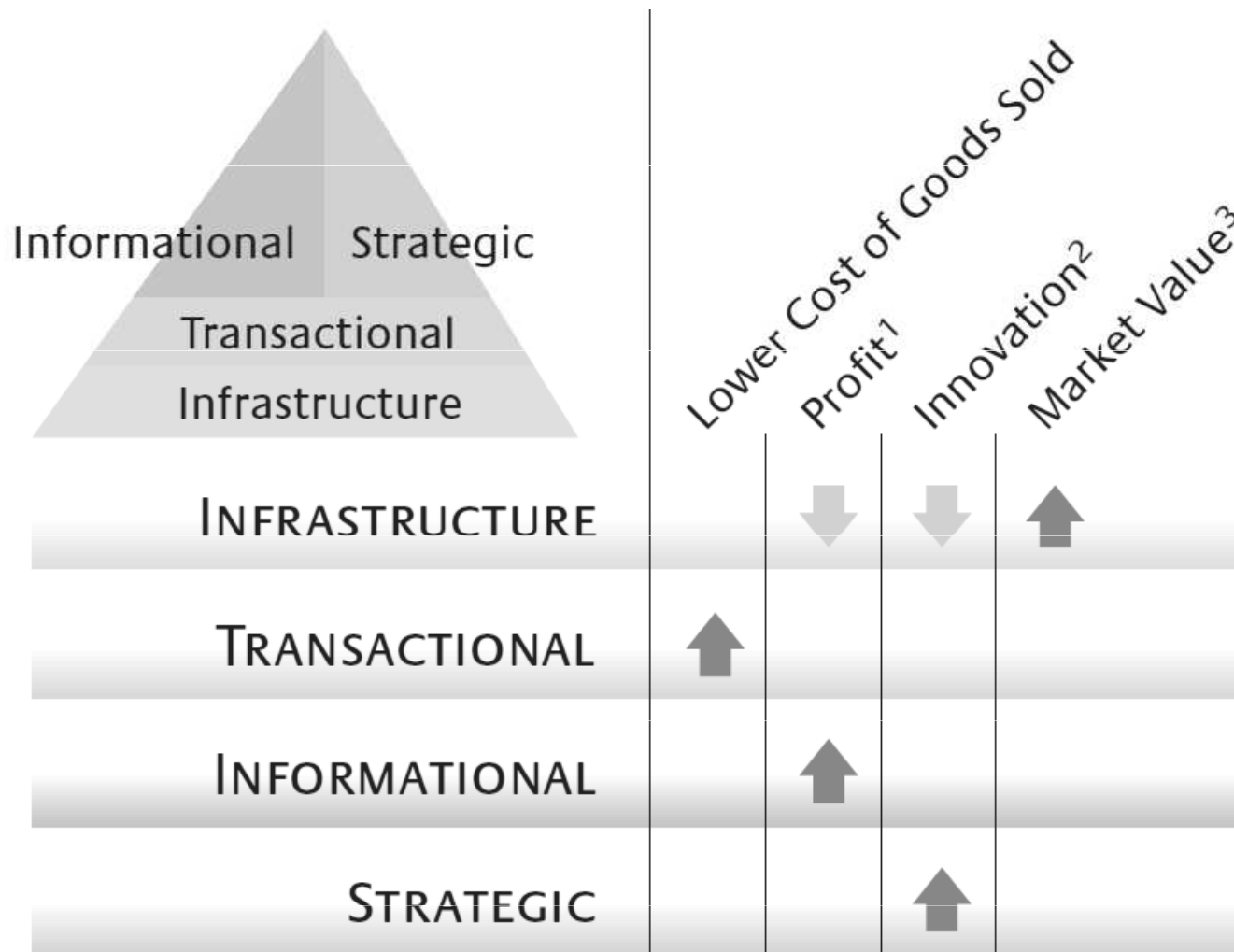
## IT Asset Category

- **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.



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

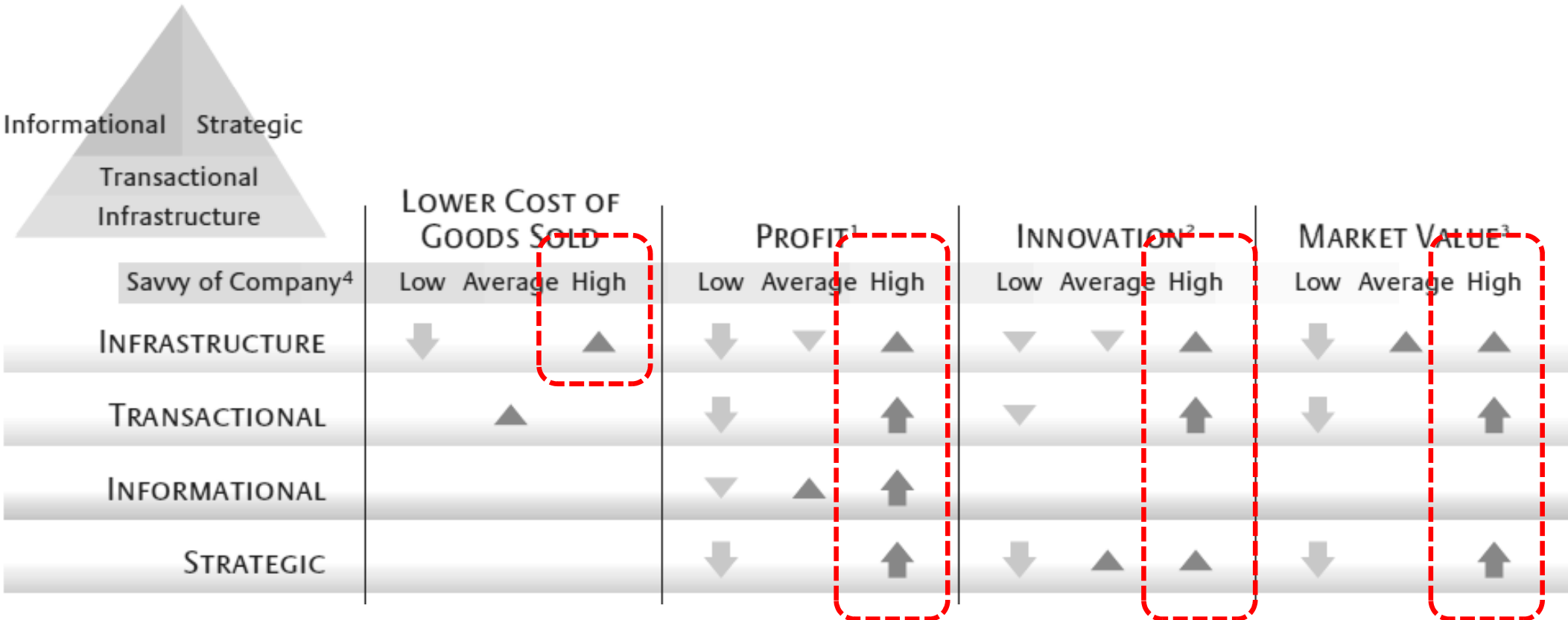
$$^2 \frac{\text{Sales From Modified Products}}{\text{Total Sales}} \text{ and } \frac{\text{Sales From New Products}}{\text{Total Sales}}$$

<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)

**Companywide IT Savvy Affects Performance**

Our research assessed each company's relative IT savvy by cataloging its practices, processes and capabilities. As indicated below, across all four IT asset classes, companies with high IT savvy achieved higher performance from each IT dollar invested.

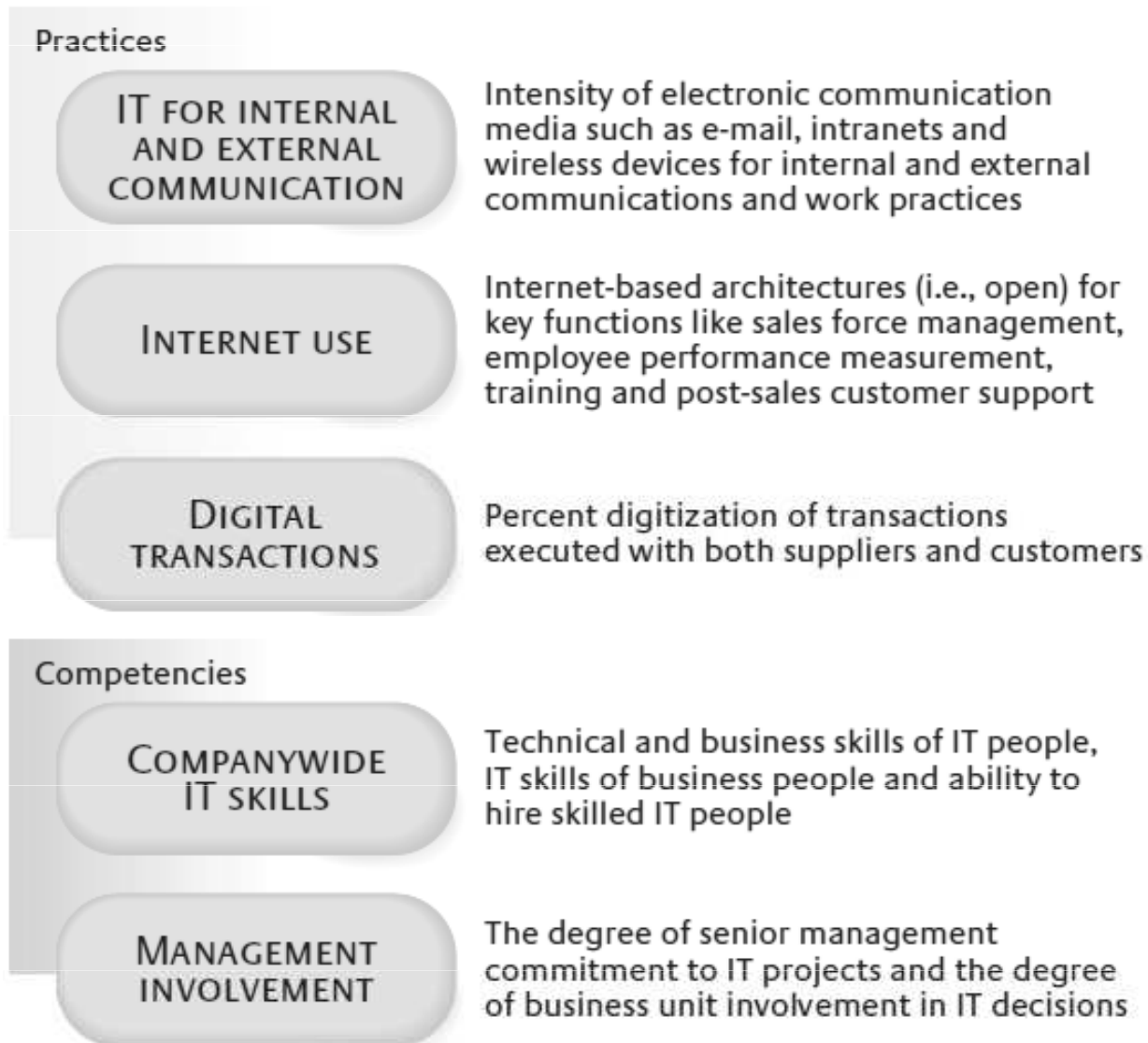


● What do you think *IT savvy* is?

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

## The Five Characteristics of IT Savvy

Companies with high IT savvy have developed five mutually reinforcing characteristics.\* The first three are practices related to IT use and the last two are competencies needed for high IT savvy.



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.

## Next Class

- Cost of IT
- Read the IT Adventure Chapter 4 and 5 and write one brief of up to 200 words by 5:30pm on Sep. 29.
- Sign up for presentation
  - IT Adventure - Chapter 4
  - IT Adventure - Chapter 5