

# MIS 5402 Spring 2017 – Managing Technology & Systems

## *Session 1-3 – Value and Cost of IT*

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*Jan. 7<sup>th</sup>, 2017*

## In this session, we will discuss

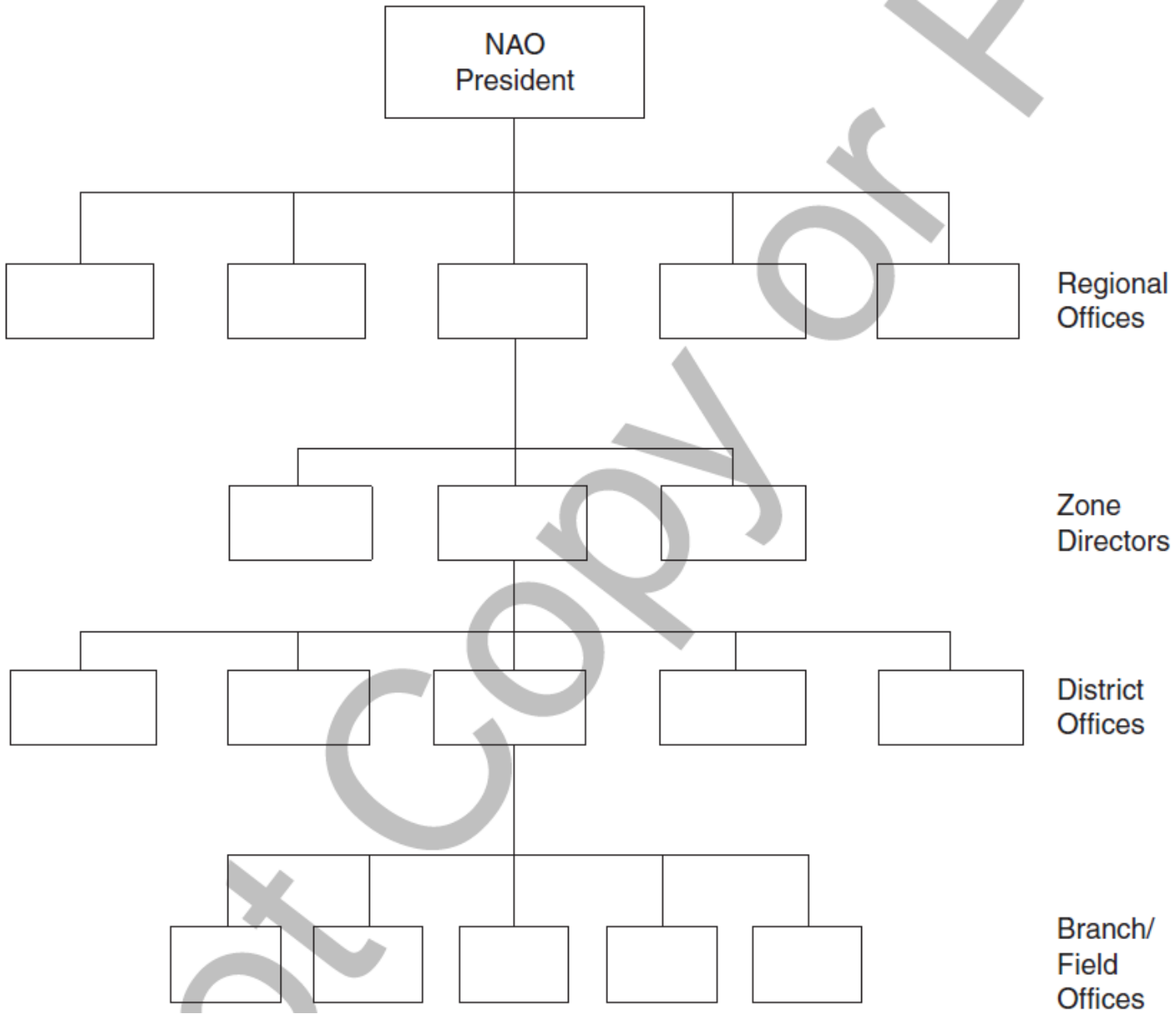
- How to evaluate business value of IT investments
- How to control IT budgets
- What should be an appropriate IT funding model? in a multi-divisional organization

## How to Justify OTISLINE and e\*Logistics?

- Let's try to guess – How much do you think Otis has spent in OTISLINE and e\*Logistics?
- 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/>



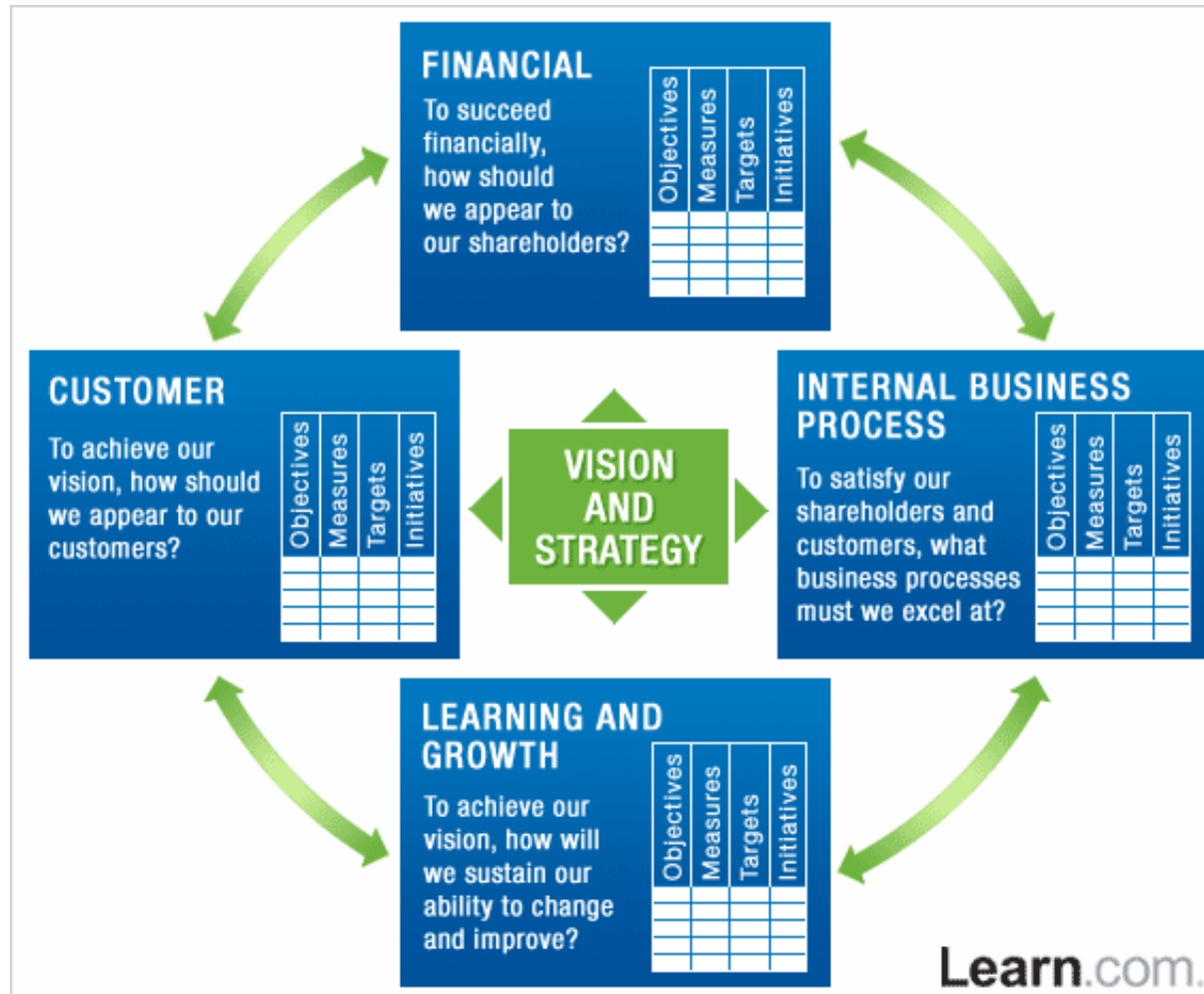
- Regional offices are geographically dispersed throughout North America.
- Zone directors have three to five district managers reporting to them.
- District managers have two to six branch/field offices reporting to them.

## How to Justify OTISLINE? (2/2)

- What are the business benefits of OTISLINE?
  - e.g. reduced response time, reduced service costs
  - These are *tangible*, measurable, or quantifiable.
- What are the *intangible* benefits?
- How do these tangible and intangible benefits contribute to Otis' bottom-line?



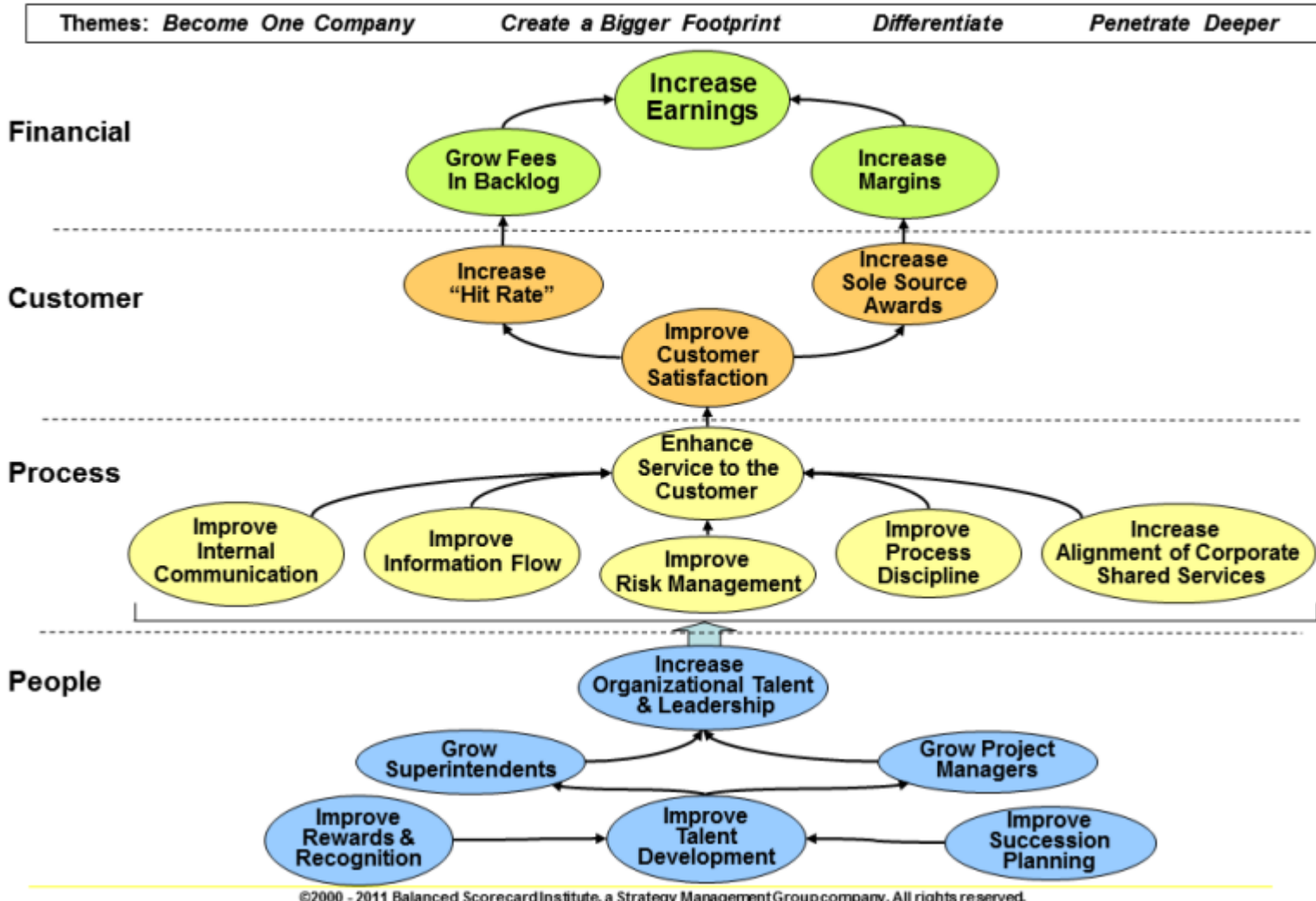
# Balanced Score Card (BSC)



## 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?

## Construction Company Strategy Map





# Business Value of OTISLINE

Improved Profitability

## 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

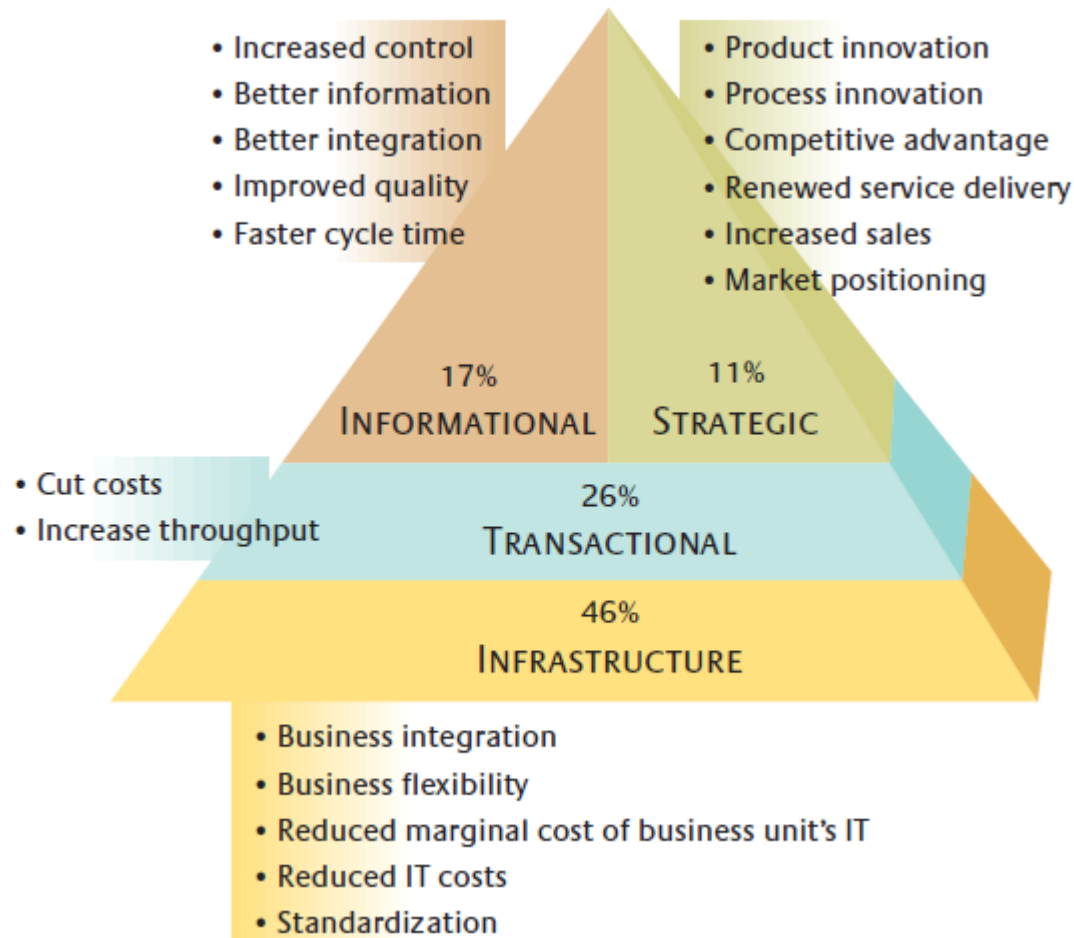
Transparency  
& Communication

Faster  
Decision Making  
& Communication

Flexible  
Employee  
Deployment

Improved  
Employee  
Training

# Business Value from Different IT Categories



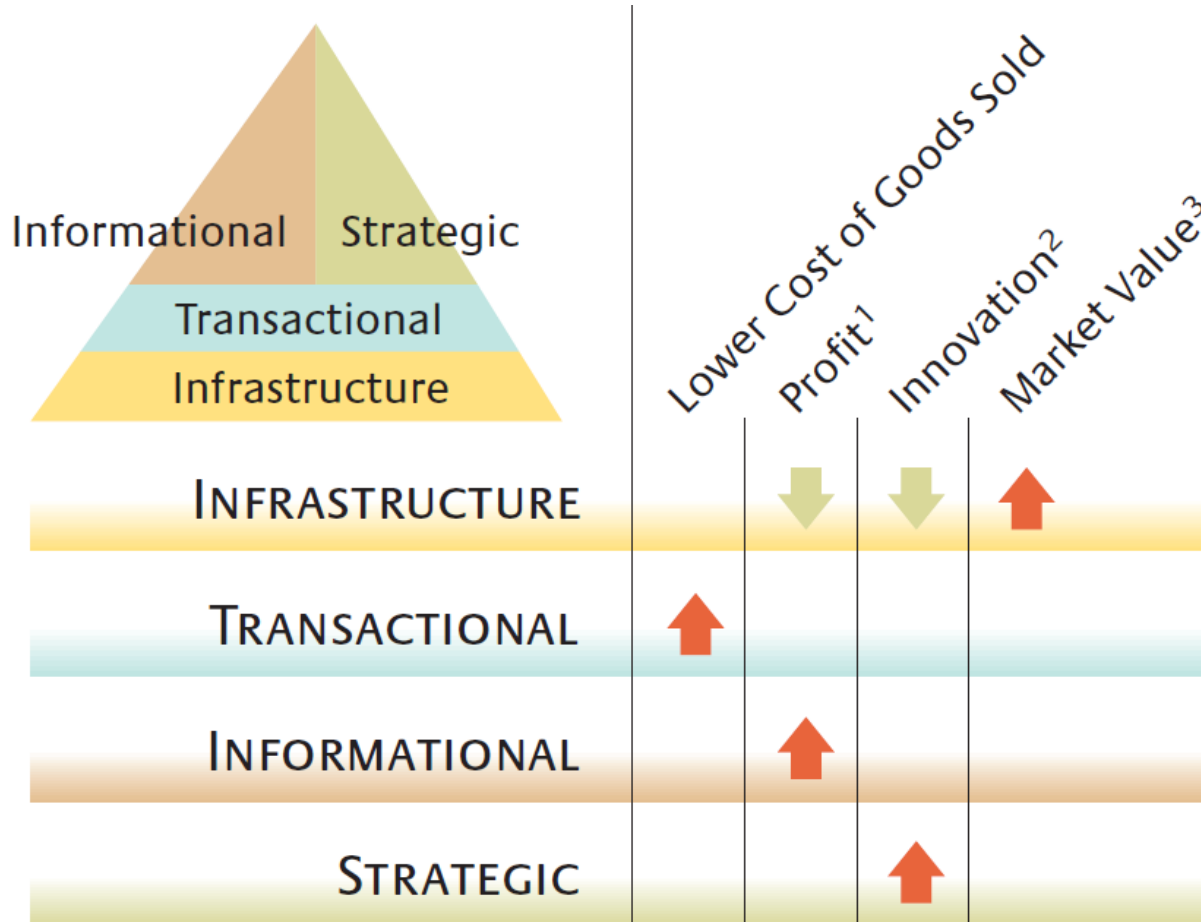
Source: Weill, P. and Aral, S. (2006) "Generating Premium Returns on Your IT Investments," MIT Sloan Management Review (47:2)

## 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 (example?)
- **Infrastructure IT** : the shared IT services used by multiple applications such as servers, network, and databases

## 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.



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

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

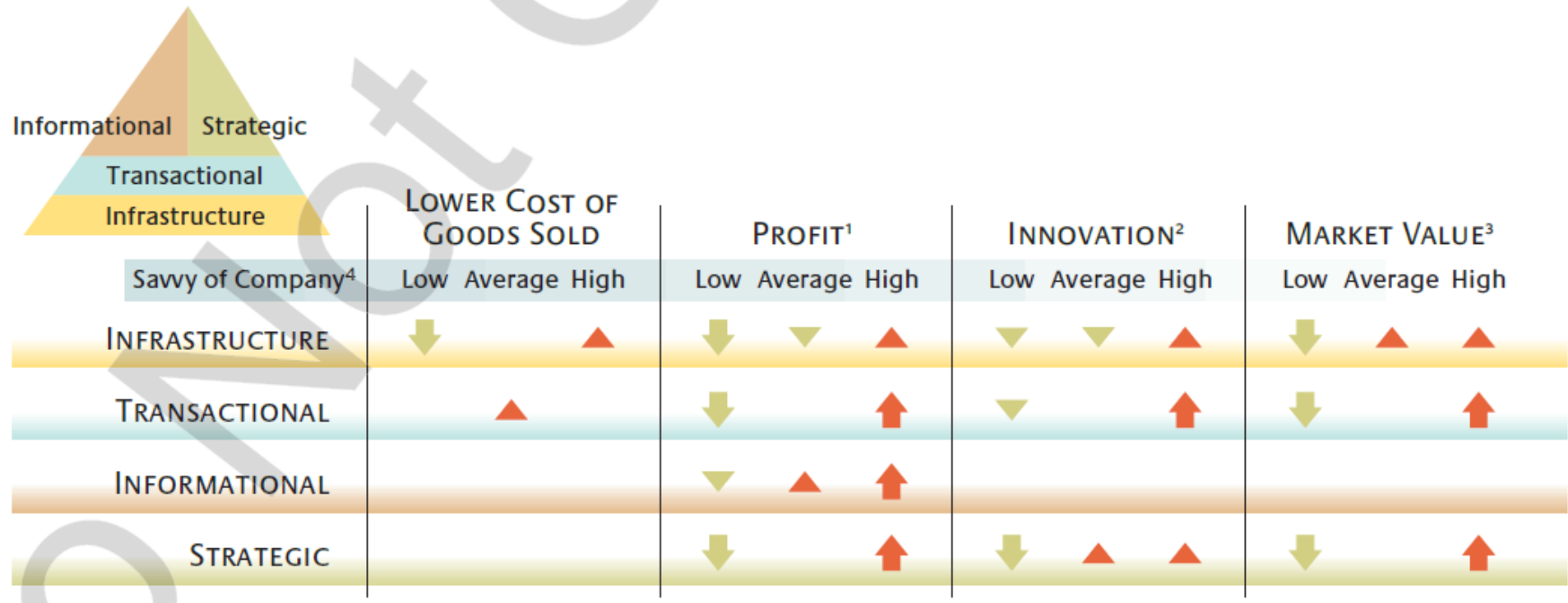
<sup>3</sup> The Market to Book value of company stock in the same year the investment is made.

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

# Not everyone enjoys value of IT.

## 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.



## 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.

### Practices

IT FOR INTERNAL  
AND EXTERNAL  
COMMUNICATION

Intensity of electronic communication media such as e-mail, intranets and wireless devices for internal and external communications and work practices

INTERNET USE

Internet-based architectures (i.e., open) for key functions like sales force management, employee performance measurement, training and post-sales customer support

DIGITAL  
TRANSACTIONS

Percent digitization of transactions executed with both suppliers and customers

### Competencies

COMPANYWIDE  
IT SKILLS

Technical and business skills of IT people, IT skills of business people and ability to hire skilled IT people

MANAGEMENT  
INVOLVEMENT

The degree of senior management commitment to IT projects and the degree of business unit involvement in IT decisions

***Is Otis IT-Savvy?***

## Justification of Business Value of IT

- Business value and benefits from IT investments are multi-faceted and dynamic.
- An executive should be able to justify business value from IT
  - not only in terms of easy-to-measure indicators such as efficiency, cost reduction, or product quality
  - but also with hard-to-measure (intangible), strategic, or long-term factors such as customer satisfaction, brand recognition, or market value.

## IT Budget Process at IVK (2/2)

- Who provides the IT budget at IVK?
- Who *controls* the IT budget?
- On what basis do the business units at IVK pay for IT?
- Who at IVK knows how the internal IT prices are calculated?
  - Is that a problem? Why or why not?





**Projected IT Budget Fiscal Year X**

Capital	FY X		
Capital budget purchases			
Development	\$ 132,000		
Infrastructure/networking	\$ 279,800		
Hardware	\$ 1,600,400		
Software	\$ 956,000		
Subtotal	\$ 2,968,200		
Disaster recovery/business continuity/second site costs			
Telephone switch and IP support	\$ 1,148,500		
Application licenses	\$ 481,450		
Workstation technology	\$ 998,807		
Networking/routing/firewalls-hardware	\$ 1,628,500		
Servers (fax, Web, e-mail, database, application process, office management)	\$ 523,000		
Other IT infrastructure expenditures (i.e., UPS, racks, spec. cabling, etc.)	\$ 660,800		
Subtotal	\$ 5,441,057		
Future Proposed Initiatives			
Security, compliance, customer service software	\$ 889,760		
Security, compliance, customer service equipment	\$ 500,000		
Re-eng project equipment	\$ 375,000		
Re-eng project software	\$ 8,800		
Common infrastructure equipment	\$ 2,350,000		
Common infrastructure software	\$ 1,835,000		
Business analytics (software and installation)	\$ 42,000		
Budgeting and systems for Finance (software and installation)	\$ 220,000		
QLP Project (equipment)	\$ 292,900		
QLP Project (software and development services)	\$ 1,470,000		
Subtotal	\$ 7,983,460		

Board										
CEO										
<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">Information Technology</td> <td style="width: 50%; text-align: center;">Capital Markets</td> </tr> <tr> <td style="width: 50%; text-align: center;">Corporate Planning</td> <td style="width: 50%; text-align: center;">Legal</td> </tr> <tr> <td style="width: 50%; text-align: center;">Financial Management</td> <td style="width: 50%; text-align: center;">Business Development</td> </tr> <tr> <td style="width: 50%; text-align: center;">Human Resources</td> <td style="width: 50%; text-align: center;">Customer Service</td> </tr> <tr> <td style="width: 50%; text-align: center;">Collections</td> <td style="width: 50%; text-align: center;">Loan Operations</td> </tr> </table>	Information Technology	Capital Markets	Corporate Planning	Legal	Financial Management	Business Development	Human Resources	Customer Service	Collections	Loan Operations
Information Technology	Capital Markets									
Corporate Planning	Legal									
Financial Management	Business Development									
Human Resources	Customer Service									
Collections	Loan Operations									

# Chargeback at Virginia IT Agency



## Enterprise Handheld Service -Blackberry



### Description

#### Blackberry Support Services

This service rate covers VITA server services and Helpdesk support for Blackberry mobile devices (recurring monthly per device). VITA currently has multiple contractors providing Blackberry equipment and service in Virginia. Blackberry Enterprise is a complete wireless e-mail solution designed specifically for enterprise environments. With Blackberry, users get access to e-mail while on the road and IT departments get centralized administration of a secure solution.

Blackberry Enterprise integrates with a user's Microsoft Exchange or Lotus Domino mailbox without the need for secondary addresses or mailboxes. Translation software is available and can be obtained from each of the contractors for their specific service.

### Cost summary

**Price type:** Fixed

**Billing category:** Monthly

**Cost basis:** Per unit

**Total:** \$15.38

## Legacy Server Support



### Description

Servers that qualify as "Legacy" are in accordance with Appendix 12 to Schedule 3.3 Legacy Operations Framework. In summary, this monthly recurring charge applies to devices that were not transformed but require support. The devices will also incur the normal hardware support fee. Legacy Help Desk Support fee will also apply.

### Prerequisites

### Cost summary

**Price type:** Fixed

**Billing category:** Monthly

**Cost basis:** per device covered

**Total:** \$615.15

<http://shop.vita.virginia.gov/Default.aspx>

## IT Budget Process at IVK (2/2)

- The business units (BUs) provide and *control* the entire IT budget.
- The IT group provides the BUs with IT services, which the BUs “purchase” for price.
- The only one who knows how to devise the “internal prices” is Mr. Geisler. There is no transparency! There is a large room for fraud.

## From now on...

- You need to abandon your assumption that a company is one entity or one actor.
- It is made up of many different entities and actors, each of which has different interests and motives.
- *It's all about politics!*



## Slush Funds of Mr. Davies

- Why had Mr. Davies, the former CIO, have to set up “slush funds”?
  - in order to fund for IT maintenance and upgrade work, which the business units refuse to pay for.
- How did he secure the slash funds?
  - For example, instead of charging \$16.15 per Blackberry support, he charged \$17.
- It is technically “embezzlement.”
  - The accounting department is supposed to discover this in auditing, which they can’t, since they do not know the internal pricing mechanisms either.

## Security Funding at IVK (1/3)

- Why is Mr. John Cho requesting an immediate funding on IT security?
  - What's the problem in IVK IT security?
  - How serious is it?
- Why has the request for IT security funding kept being denied?



<http://www.foreclosureindustrynews.com/2012/04/27/admission-the-bank-spent-too-much-money-defending-foreclosure-lawsuit-no-cash-for-keys-for-you/denied-denied-denied/>

## Security Funding at IVK (2/3)

- The request for IT security funding is being denied because it has little *immediate customer benefits*.
  - By “customer,” it means customers of the IT group – the business units.
- Security breaches are *not likely but possible*. Unless threats are imminent, the BUs would not take this seriously.
- Because of the technical nature, the BUs are hard to understand the risks and consequences of security failures.
  - Mr. Davis did not do a good job in convincing the BUs. He speaks in “technology” languages.

## Show me the money!

- Suppose that the CEO and the business unit heads are asking
  - why do we have to fund in an IT system for our new home-equity loan business? (Cost : \$1 million)
  - why do we have to fund in an security upgrade project? (Cost : \$ 1 million)
- Suppose that they have only \$1 million and will choose only either one (no partial funding).
  - Which one should they choose?
- Write justification in a group.
  - One best team will get a waiver.





## Security Funding at IVK (3/3)

- Suppose that business unit heads completely understand the urgent need for IT security fund.
- Suppose that they completely understand the risks and consequences from IT security failures?
- Will they pay for IT security *willingly*?



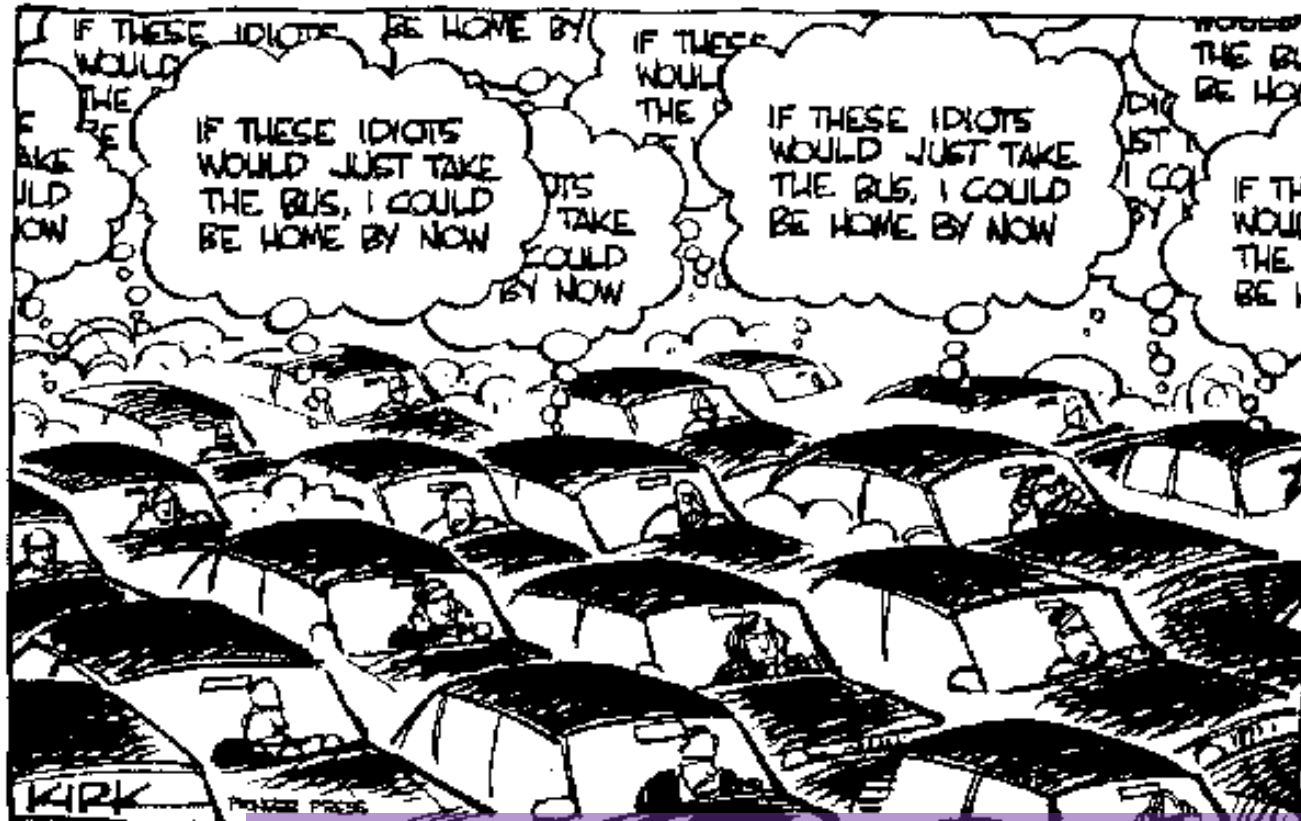
## Do you know why? (1/2)

- Do you know why there is no group assignment in this course?
  - because of free-riders
- In an individual assignment, the credits from all your efforts go to yourself.
- In a group assignment, the credits from your efforts are shared by your group members.
  - less incentive to work hard in a group assignment
- Free-riders in fact behave rationally in an economic sense.

## Do you know why? (2/2)

- Do you know why you have to pay taxes? For what?
  - for public services such as police, fire department, public roads
- If citizens are asked to donate any amount to a fire department, most of them will contribute zero dollar.
  - Free-riders in fact behave rationally in an economic sense.

# Tragedy of the Commons



*If all owns one thing together,  
everyone will overuse it and nobody takes care of it.*

<http://spinachinourteeth.wordpress.com/2011/11/11/the-tragedy-of-the-commons-reconsidered/>

## Public Good

- A good or service that has the non-excludability and non-rivalry properties
  - By non-excludability, meaning that one cannot be excluded from using the good
  - By non-rivalry, meaning that anyone's consumption does not prevent others' consumption
- Any example? – National defense, fresh air and water, public roads, public safety, library, public park, and free-to-air television
- Who should pay for public goods? How?
  - Nobody is willing to pay for it.
  - A government pays for it by taxing consumers (citizens).

## Prisoner's Dilemma (1/2)

- If both of the two suspects keep their mouth shut, they go to prison for one year. If both confess, they go for 2 years.
- If one confesses and the other does not, the former go free and the latter gets locked up for 3 years.

		Suspect B	
		Keep mouth shut	Confess
Suspect A	Keep mouth shut	-1, -1	-3, 0
	Confess	0, -3	-2, -2

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		Suspect B	
		Keep mouth shut	Confess
Suspect A	Keep mouth shut	-1, -1	-3, 0
	Confess	0, -3	-2, -2

## Prisoner's Dilemma (2/2)

- In the absence of coordination between the two suspects,
- No matter what Suspect B does, it is Suspect A's best interest to confess, and vice versa.
- In equilibrium, both of the suspects will confess and end up in going to jail for two years,
  - *even though they could have cooperated with each other and gone for one year by keeping both mouths shut.*
- Prisoner's Dilemma : Individuals' rational, selfish actions result in consequences that are less optimal than cooperation and coordination.



## Prisoner's Dilemma at Final Exam

 UNIVERSITY OF  
MARYLAND  

Here you have the opportunity to earn some extra credit on your final paper grade. Select whether you want **2 points** or **6 points** added onto your final paper grade. But there's a small catch: if more than 10% of the class selects 6 points, then no one gets any points. Your responses will be anonymous to the rest of the class, only I will see the responses.

---

2 points

6 points

## Prisoner's Dilemma at Group Project

- If you and your teammate work together, you'll get 10. If only one of them works, both get 7. If both free-ride, you get 0.
- If you and your teammate work together, you spend 6. If only one of them works, you or he/she spends 8.

		Your Teammate	
		Work for group work	Free-ride
You	Work for group work	4, 4	-1, 7
	Free-ride	7, -1	0, 0

## Prisoner's Dilemma in Real Life

- Prisoner's Dilemma : Individuals' rational, selfish actions result in consequences that are less optimal than cooperation and coordination.
- In a group, find three real-life examples of Prisoner's Dilemma and how to resolve these situations.
  - One best team will get a waiver.



<https://twitter.com/shaunhin/status/616378904752848896>

## Prisoner's Dilemma at IVK (1/2)

- Revenue of each business unit is \$10m. Cost for security is \$6 million.
- Risk from the unsecured system to each business unit is worth \$5m. Risk from the secured system is \$0m.

		Business Unit B	
		Pay for Security	Don't Pay
Business Unit A	Pay for Security	7, 7	4, 10
	Don't Pay	10, 4	5, 5

## Prisoner's Dilemma at IVK (2/2)

- In the absence of coordination between the business units,
- No matter what Business Unit B does, it is Business Unit A's best interest not to pay for security and to be a *free-rider*, and vice versa.
- In equilibrium, both of the BUs will not pay for the security and choose to take the chances of security threats,
  - *even though they could have cooperated with each other and secured the system by paying half.*

## Public Goods at IVK

- IT security and IT infrastructure are public goods at IVK, just like police and public roads.
  - We cannot say “We’ll secure Loan Operations but not Business Development.” Everyone has to be protected.
- Even when senior managers in business units at IVK are aware well and completely of IT security matters, they will not willingly fund IT security.
  - Then, what’s the solution?
  - A CIO or a CEO has to *tax* the business units for the security, and the CIO controls for it.

## Mr. Barton's Decision

- What's the consideration and decision of Mr. Barton in terms of IT budget funding and controls?
  - He wants to control the *entire* IT funding.
  - He will be able to fund the belated IT security and maintenance projects.



## One Neck in the Noose

- What does Maggie, Mr. Barton's girlfriend/consultant, mean by "one neck in the noose"?
- What will happen if Mr. Barton controls the entire IT budget but things go south?
  - Mr. Barton takes all the responsibility for any failure.





## Another Issue in Mr. Barton's Decision (1/4)

- What would be other problems if Mr. Barton controls the entire IT budget and the business units pay nothing for the IT services?
  - He might not make an informed decision every time, since he might be overwhelmed by the amount of decisions he has to make.
  - Fellow business executives will challenge his decisions, since he is neither their boss nor “an expert” in IT yet.

## Another Issue in Mr. Barton's Decision (2/4)

- Suppose that you pay income tax and can live in any house you want for free! (Your government provides housing for you.)
  - Everyone will want to live in a bigger house.
- Suppose that the utilities in your apartment are included in a monthly rent?
  - Everyone will use electricity, water, and heats like they are free.

## Another Issue in Mr. Barton's Decision (3/4)

- What would happen if Mr. Barton controls the entire IT budget?
  - Every BU will demand more IT services than they need.
- What should be “private goods” in IVK's IT system? Who should pay for them?
  - Application systems, PC, or PDA for individual business units
  - *The BUs have to pay for them.*

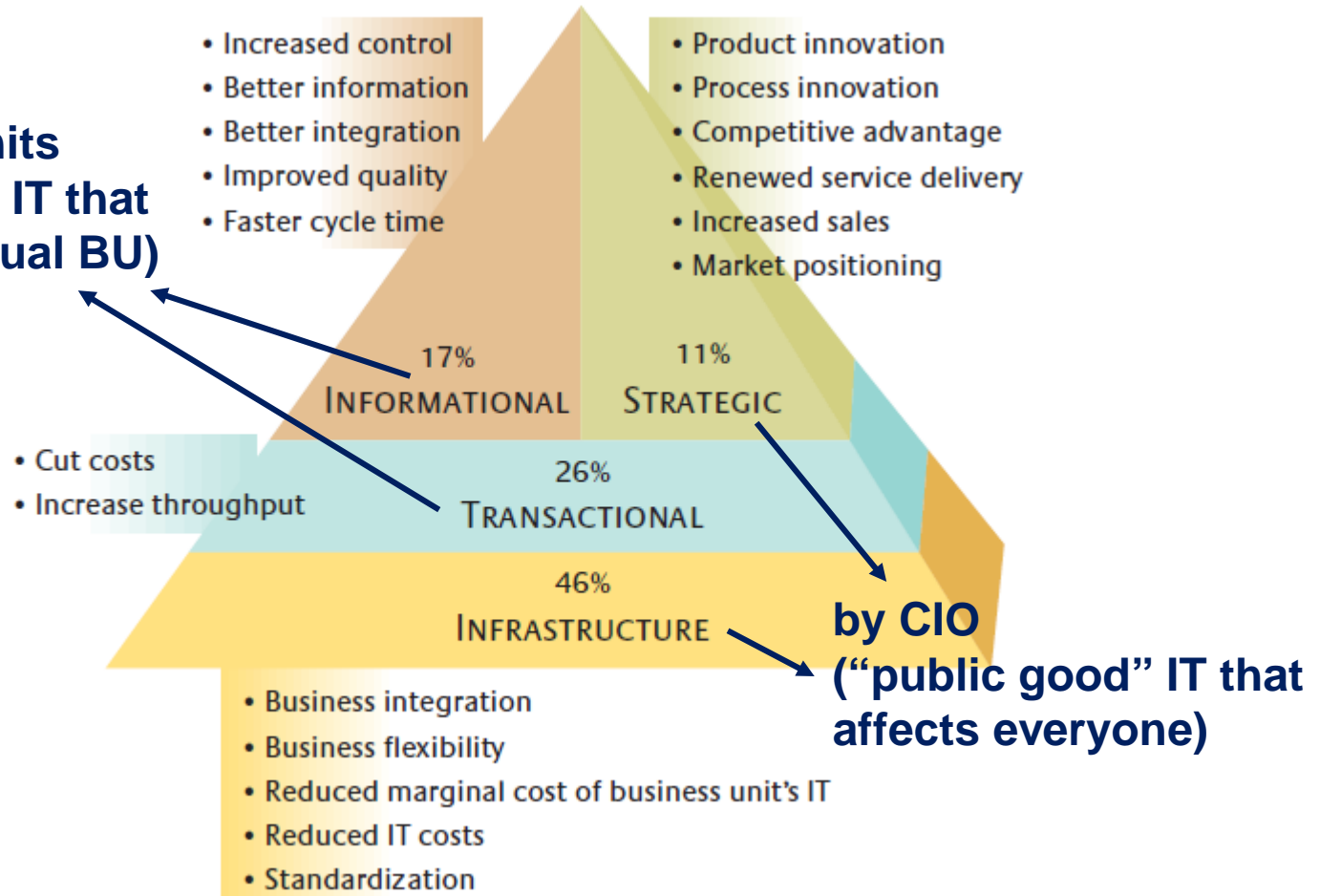
## Another Issue in Mr. Barton's Decision (4/4)

- Is there any middle ground between the current model and Mr. Barton's decision?
- IT services that are used by an business unit (private goods) are paid by that business unit.
- IT services that are shared by the entire IVK (public goods) are controlled and funded by the CIO.



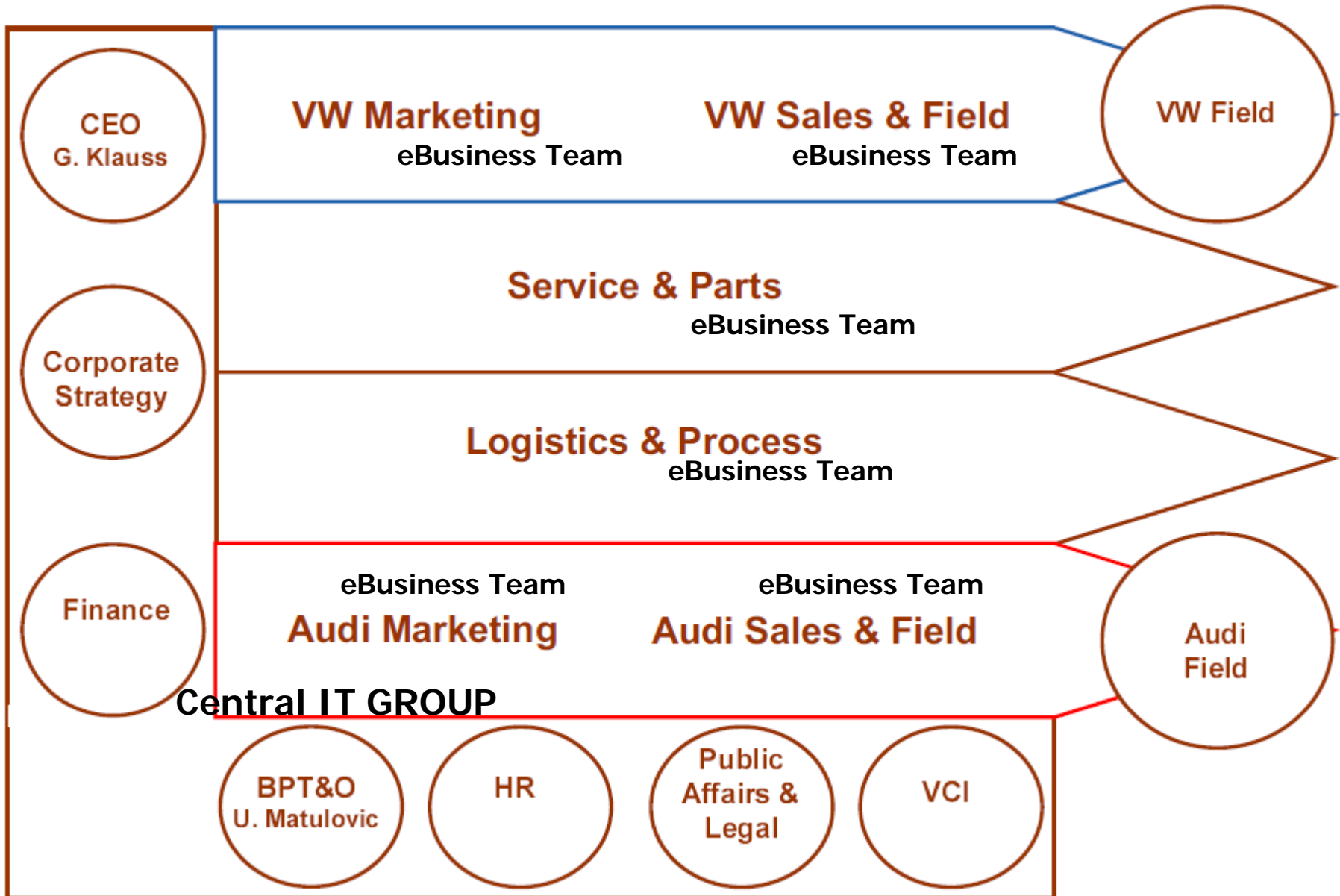
# Who should fund each type of IT?

**by Business Units**  
 (“private good” IT that benefits individual BU)

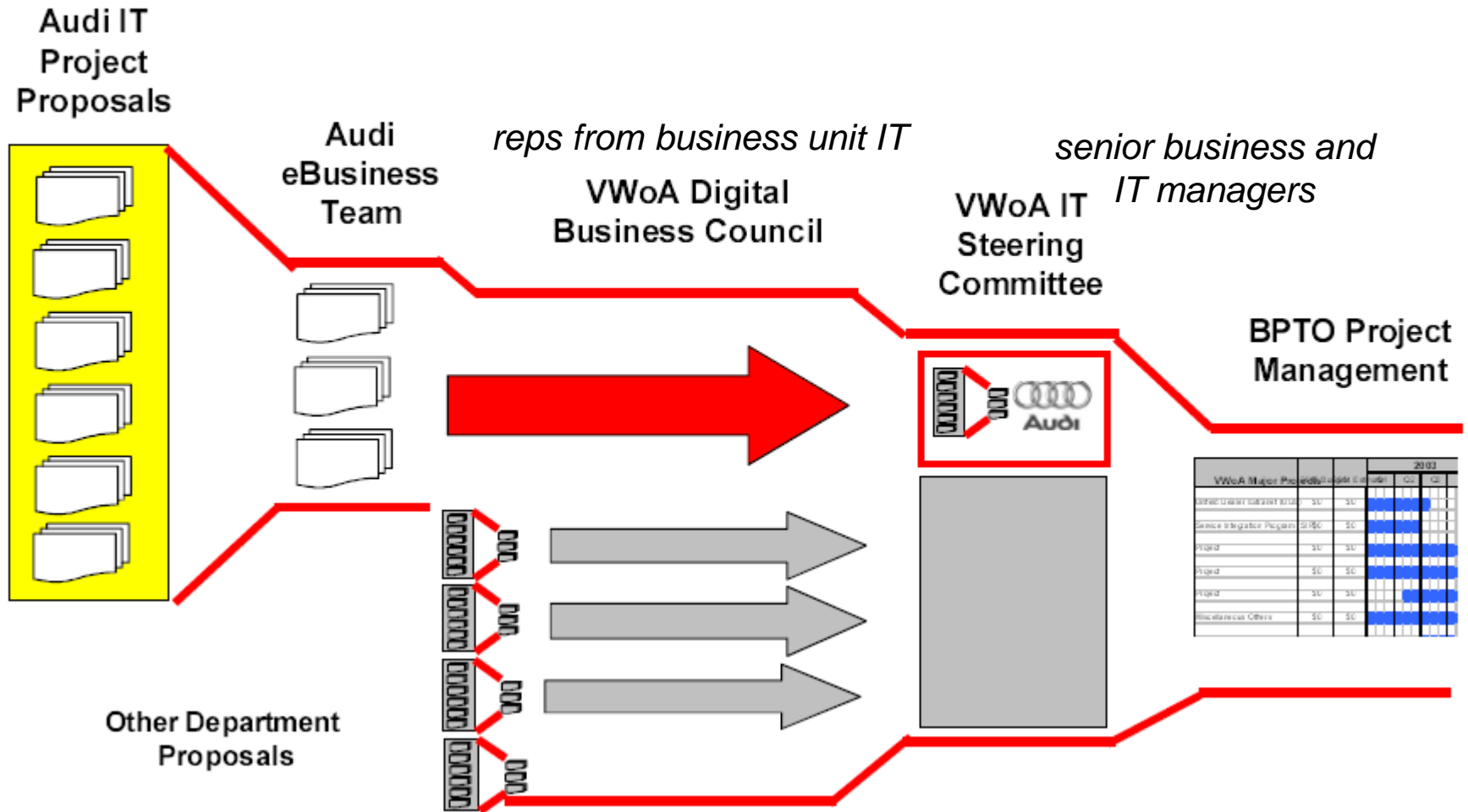


Source: Weill, P. and Aral, S. (2006) “Generating Premium Returns on Your IT Investments,” MIT Sloan Management Review (47:2)

# Organizational Structure at VWoA



# VWoA IT Project Approval Process



Enterprise Goal Area	Rank
Customer Loyalty	1
New Vehicle Value	2
Stable Business Infrastructure	3
Pre-Owned Vehicle Business	4
Optimize the Supply Flow	5

**Next Round of Growth Goals**

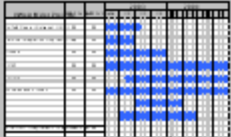
**2004 Goal Portfolios**

**Top 3 Business Unit Proposals**

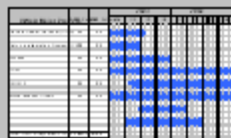
	Loyalty	New Vehicle	Stable Infra	Pre Owned	Supply Flow
<b>Audi</b>					
Project				\$ 1,950,000	
Project	\$ 772,000				
Project					
<b>CARE Center</b>					
Project					
Project					
Project	\$ 450,000				
<b>CSC</b>					
Project					
<b>D&amp;L</b>					
Project					\$ 471,540
Project					\$ 730,880
Project					
<b>HR</b>					
Project					
<b>Parts</b>					
Project					
Project					
Project					
<b>Quality &amp; Service</b>					
Project		\$ 480,000			
Project		\$ 542,000			
Project		\$ 118,000			
<b>Treasury</b>					
Project			\$ -		
<b>VW</b>					
Project					
Project					
Project					
<b>Goal Champions</b>					
Project	\$ 700,000				
Project				\$ 150,000	

**2004 Goal Portfolios**

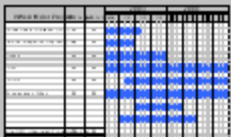
**1 Loyalty**



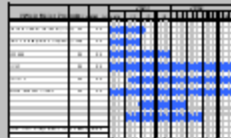
**2 New Vehicle**



**4 Pre Owned**



**5 Supply Flow**



Actual Data Withheld



## IT Funding Process in VW America (1/4)

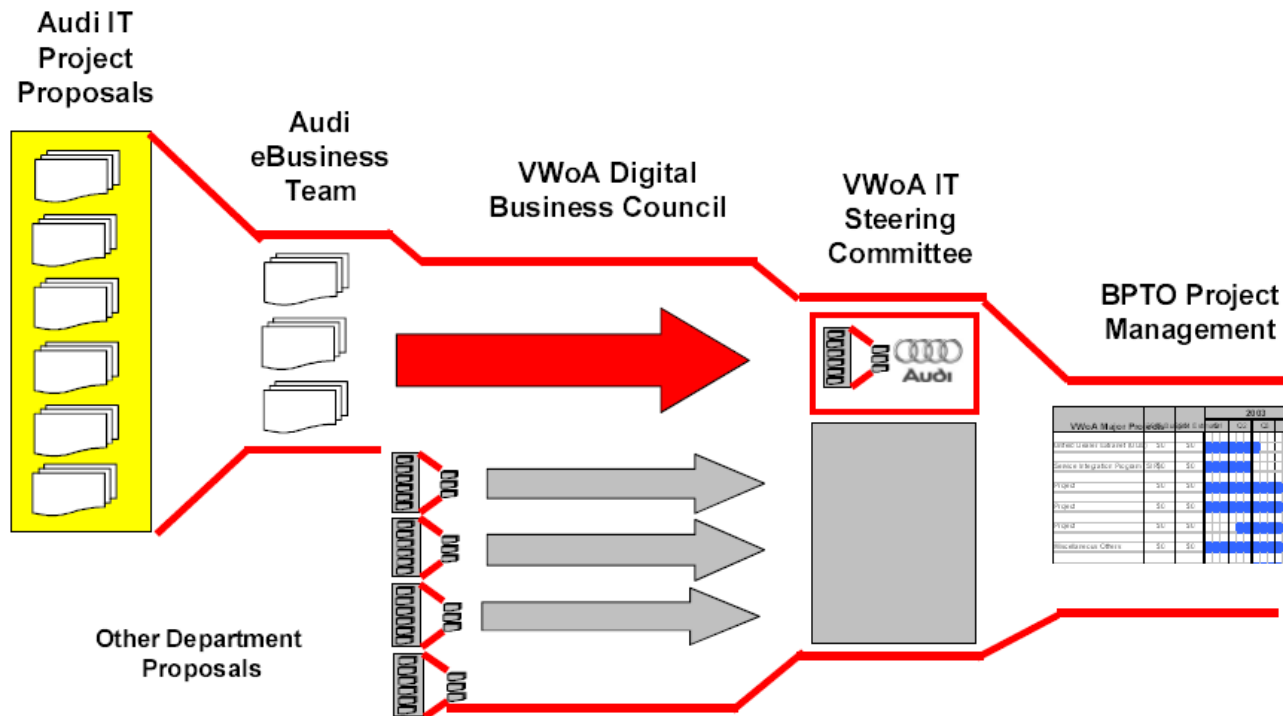
- Both IT and the business units together are involved in the IT funding decision process.
- Proposed IT projects are grouped into three categories.
  - Stay in Business – Qualify
  - Option-Creating Investment – Compete
  - Return on Investment – in-between
- Funding decisions to proposed projects are driven by
  - expected ROI and business value (e.g. customer value, new vehicle value)
  - importance to strategic goals of VWoA.

## IT Funding Process in VW America (2/4)

- “Of the roughly \$60 million available overall, \$16 million had been set aside to fund “stay in business” initiatives, most of them infrastructure projects under the discretion of CIO Matuloyic” (p. 8)
  - Because infrastructure projects are public goods.
- “Through the lenses of the business architecture and the new process, it appeared that several projects favored by business units did not have sufficient enterprise value to make the funding cut.” (p. 8)

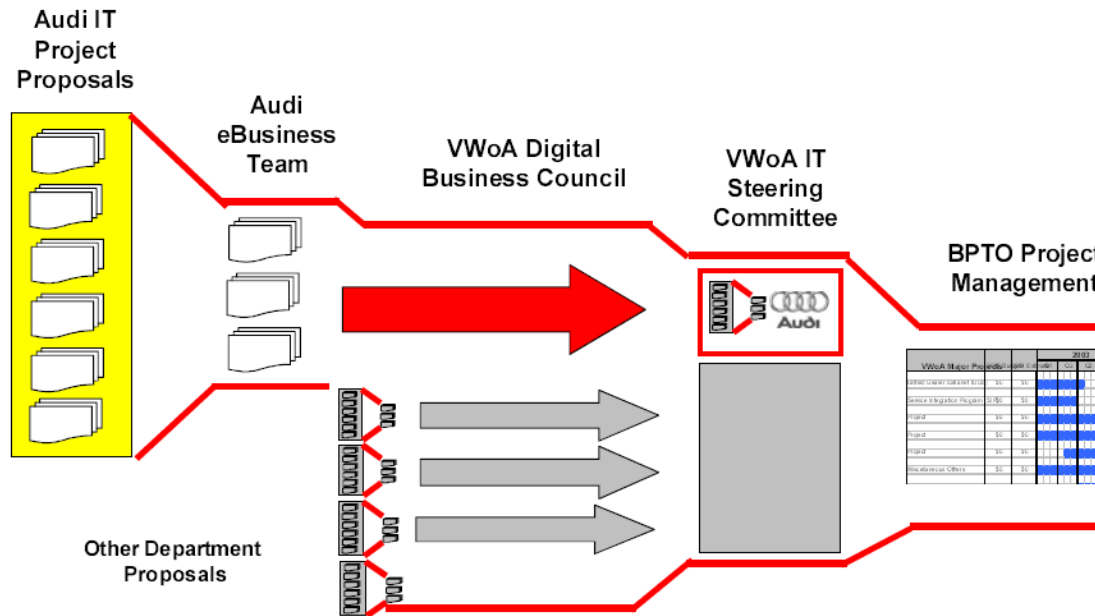


## IT Funding Process in VW America (3/4)



- How would you evaluate the IT funding process at VWoA? Is it better than the process at IVK? How?
- What would be the problems in this funding process?

## IT Funding Process in VW America (4/4)

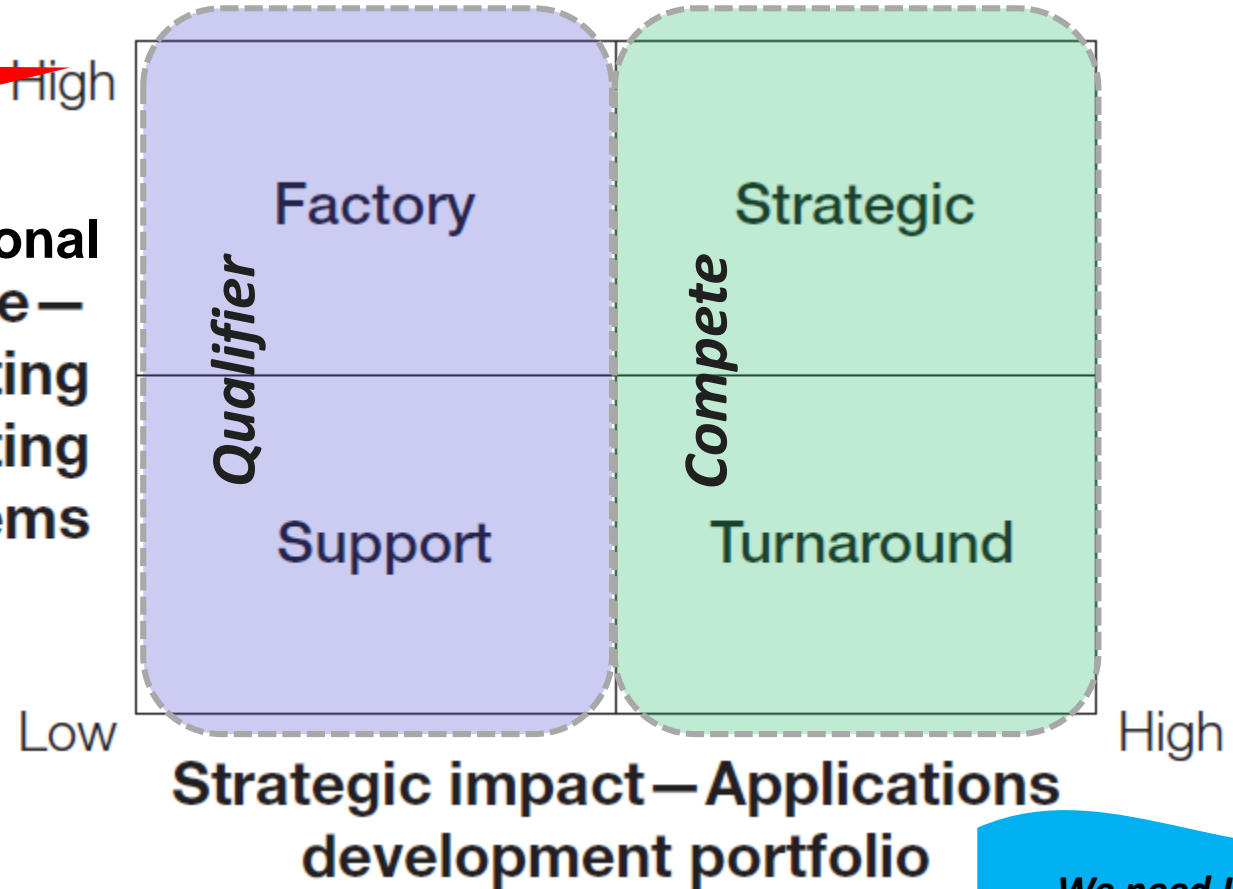


- This is more transparent than the IVK process. Everyone can agree with decisions (may not be happy though).
- This is slower and time-consuming. Unable to develop and deploy a new IT system quickly

# IT Strategic Impact Grid (1/2)

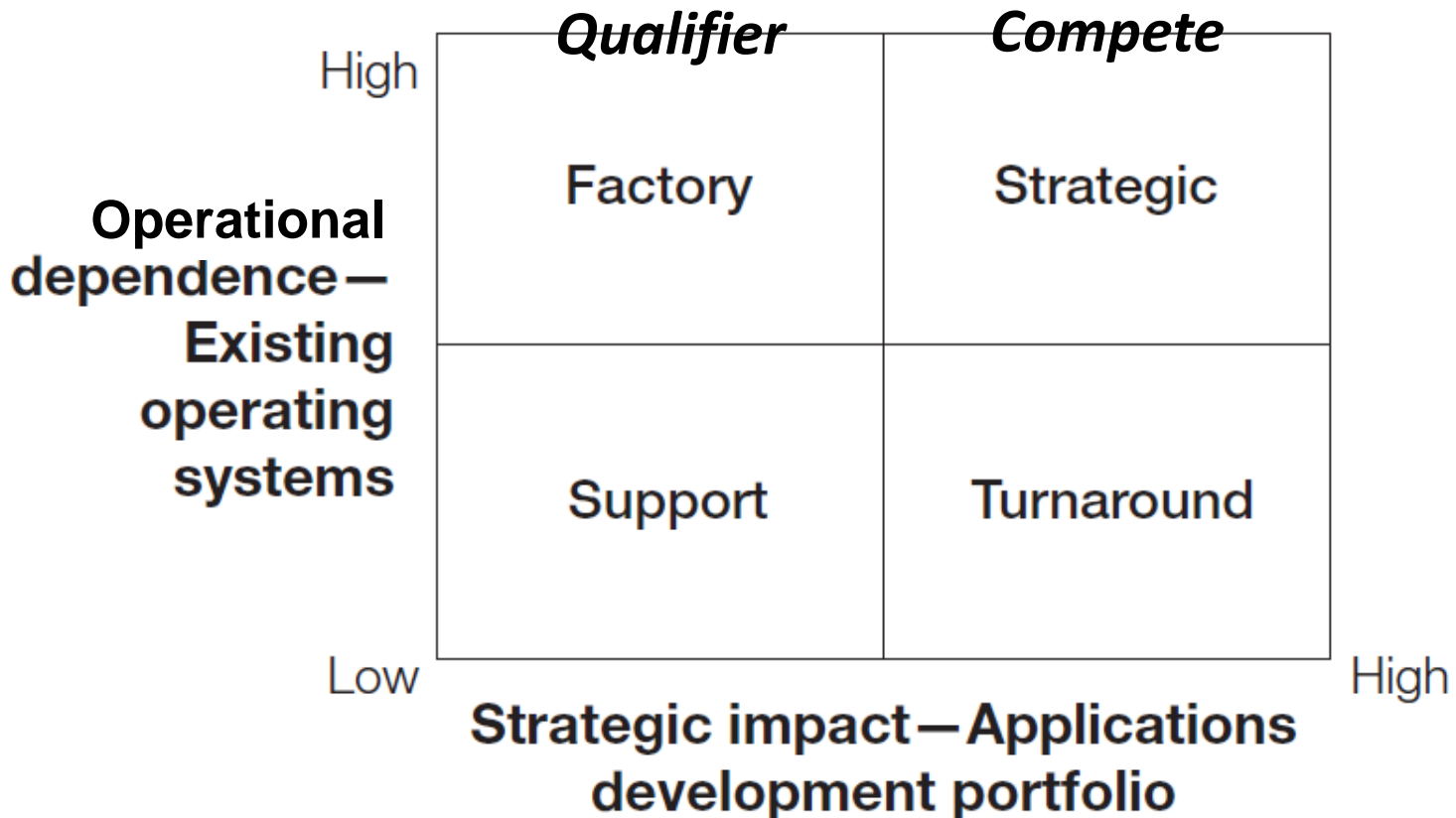
*If IT fails, business fails.*

**Operational dependence – Existing operating systems**



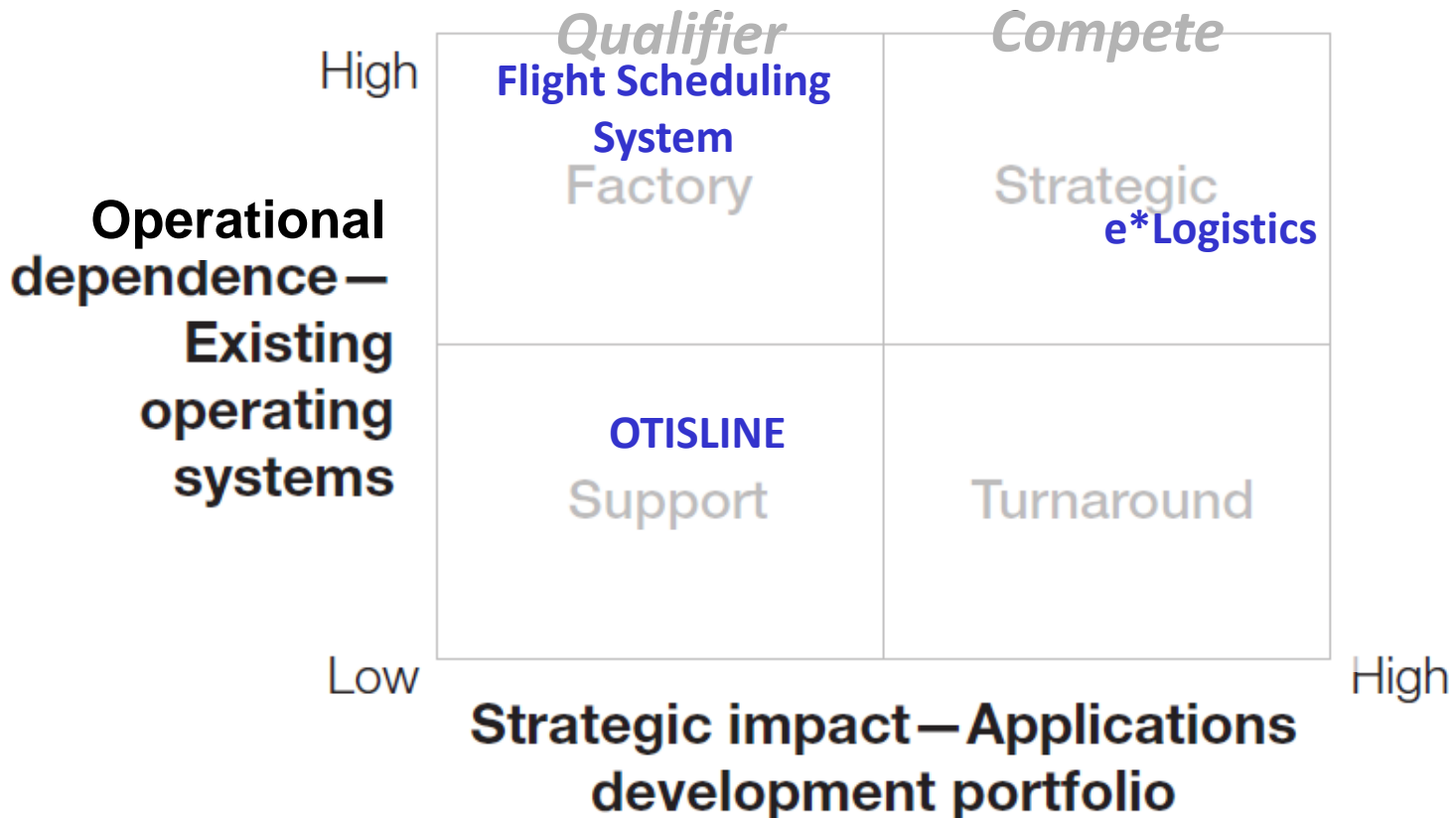
*We need IT for our strategy & future.*

## IT Strategic Impact Grid (2/2)



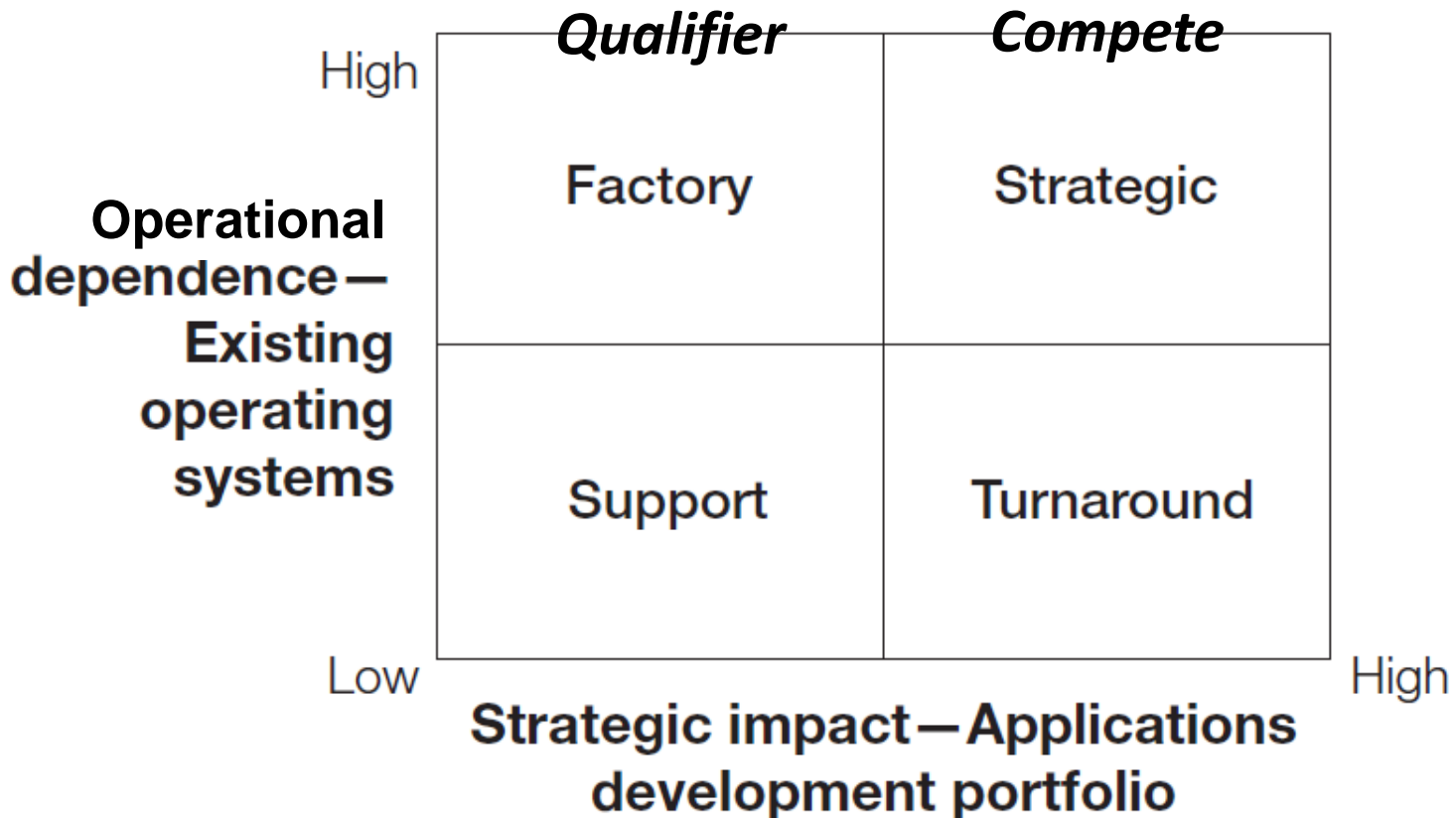
- Where can we put OTISLINE, e\*Logistics, and, a flight-scheduling system?

## IT Strategic Impact Grid (2/2)



- Where can we put OTISLINE, e\*Logistics, and, a flight-scheduling system?

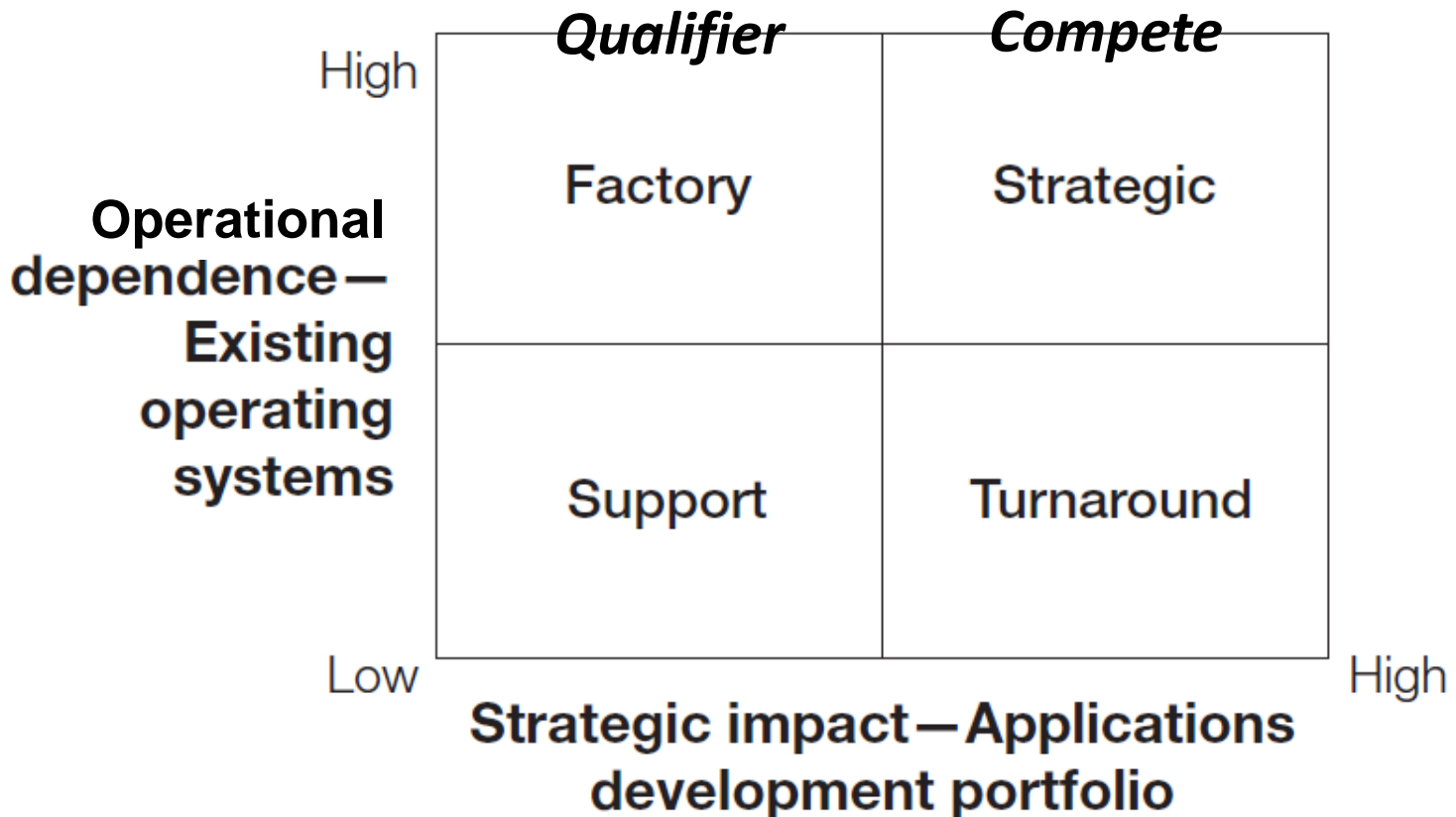
## Strategic Grid and IT Cost (1/3)



- What should the *right* amount of IT spending in each grid?

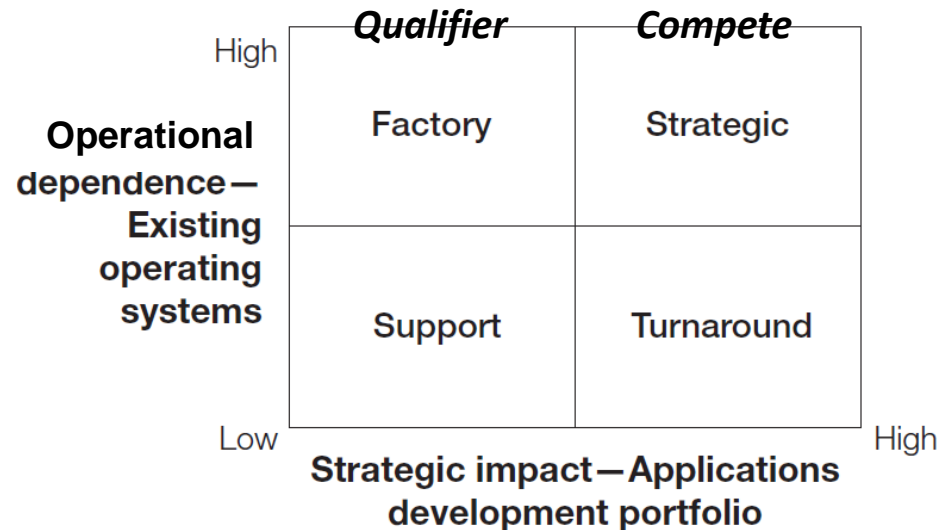


## Strategic Grid and IT Cost (2/3)



- If you've got \$10 million for your IT budget, how would you divide into each grid? depends on what?

## Where to Spend More?



- if you are #1 in a stable, mature industry?
- if you are a follower and want to be #1?
- if you are in a dynamic, growing industry?
- if you are in a tightly-regulated industry?
- if you are in an industry where IT is “mission-critical”?

## Strategic Grid and IT Cost (3/3)

- The division of a limited IT budget amongst the four IT grids depends on competitive strategies and business environments.
  - If you are #1 in a stable, mature industry, spend more in Qualifier (Factory/Support).
  - If you are a follower who wants to be #1 or in a growing, dynamic industry, spend more in Compete (Strategic/Turnaround).
  - If you are in a tightly-regulated industry, spend more in Qualifier (Factory/Support).
  - If you are in an industry where IT is very dependent or “mission-critical”, spend more in Factory and Strategic.