

**MIS 3534 Fall 2014 –  
Strategic Management of  
Information Technology  
*Day 8 – Enterprise Architecture***

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## **Certifications for MIS majors**

- Certified Information Systems Auditor (CISA)
- Certified Information Security Manager (CISM)
- Project Management Professional (PMP)
- Oracle Certified Professional (OCP)
- SAP Certified Associate/Professional
- Cisco Certified Associate/Professional

## **Today, we will discuss ...**

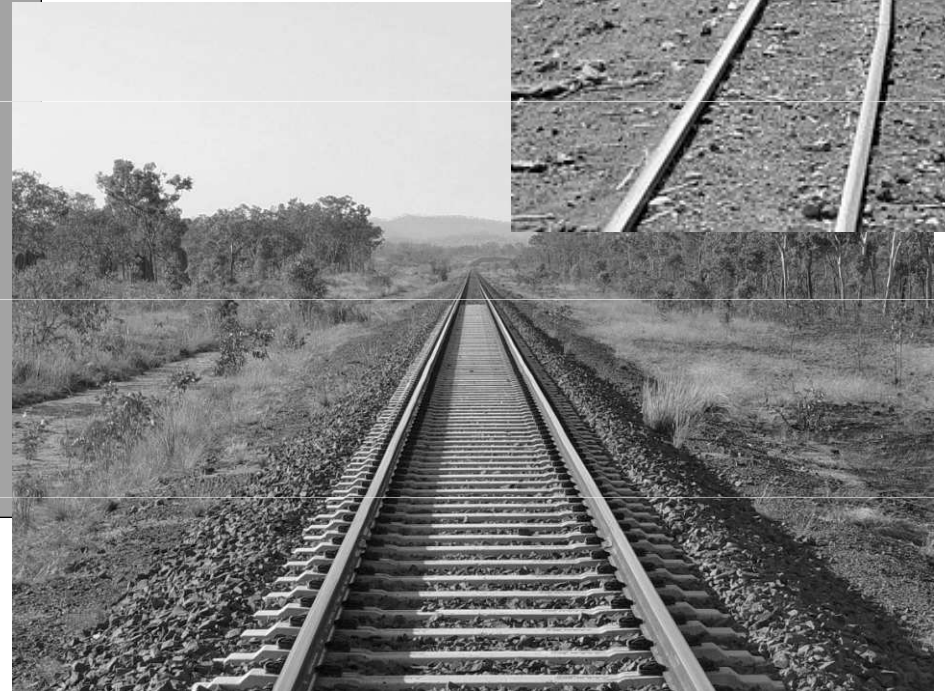
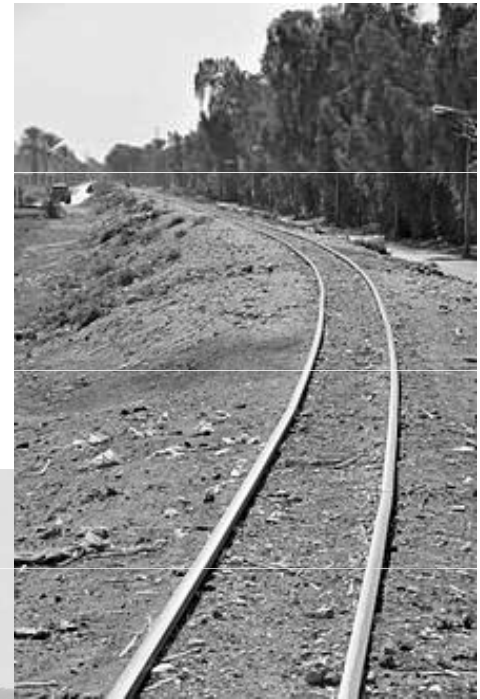
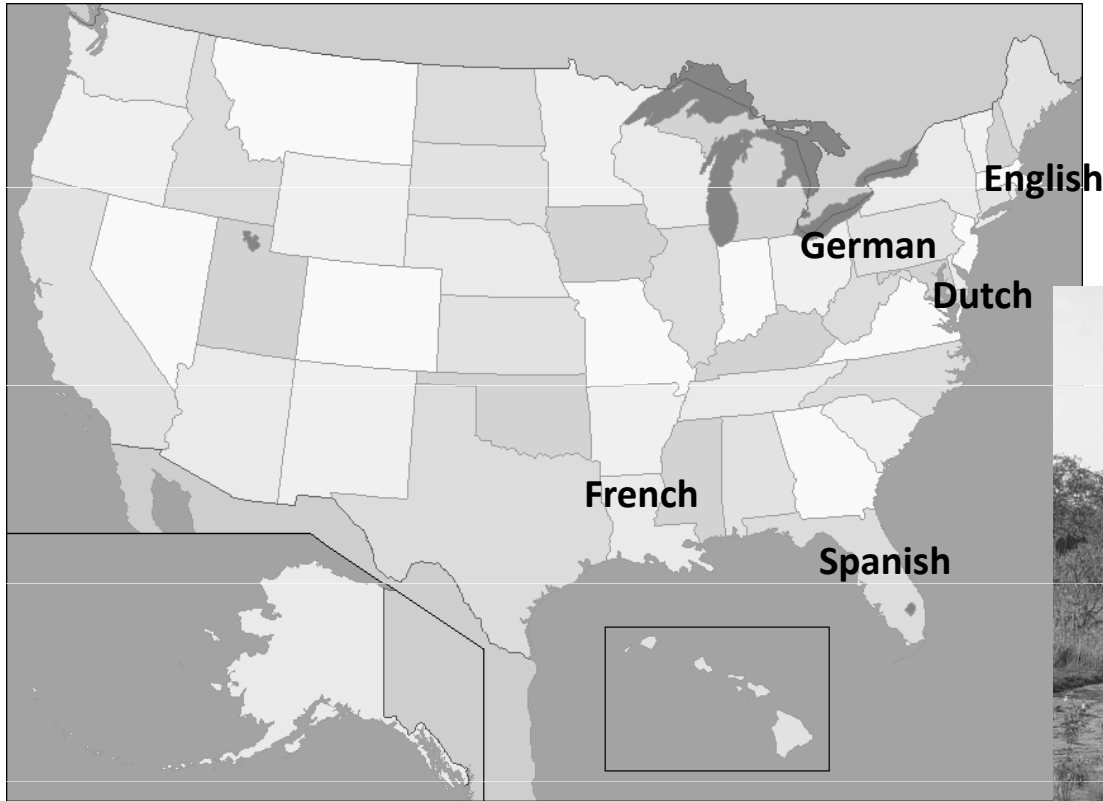
- What are the nature of the tradeoff between standard and freedom in regard to enterprise IT architecture in a multi-divisional organization?
- What are the considerations in IT standard and platform?

## Standard in Our Life (1/2)

- What kind of standards do we enjoy in our daily life?
- Why do we need them? What if we don't have standards?



# Standard in the United States



[http://www.yourchildlearns.com/us\\_map.htm](http://www.yourchildlearns.com/us_map.htm)  
<http://www.development.lk/news.php?news=948>  
[http://en.wikipedia.org/wiki/Narrow\\_gauge\\_railway](http://en.wikipedia.org/wiki/Narrow_gauge_railway)

# Standard in Europe (1/2)



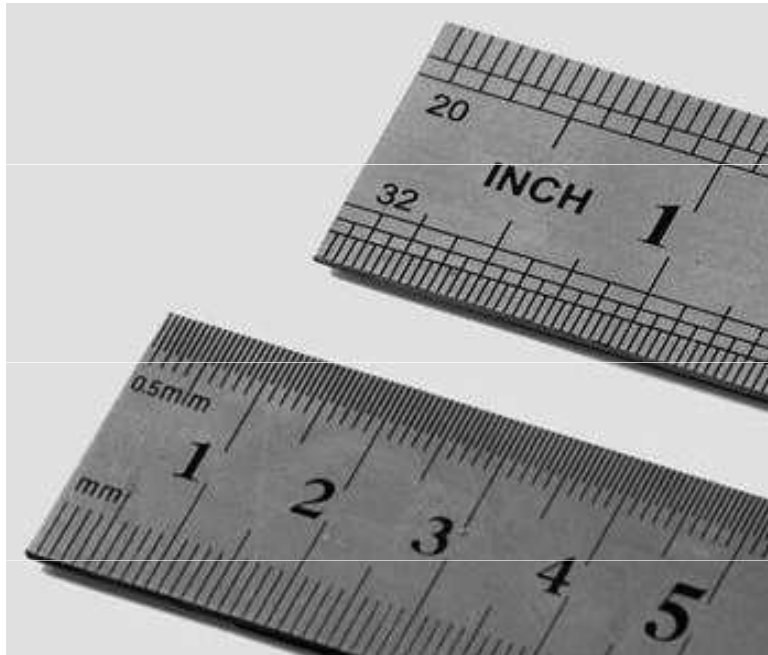
- Why do many European nations use Euro as a common currency?
- Why do the U.K. and some others refuse to adopt Euro?

<http://flagpedia.net/currency/euro>  
<http://www.iglobalexports.com/internationalblog/tag/euro-map/>

## Standard in Europe (2/2)

- European nations have adopted Euro as a standard currency system to streamline trades/movement of goods and services amongst the nations.
- Some other nations have not adopted Euro because they do not want to lose *control and flexibility* in finance and monetary policies.
  - Greece is hard to get out of its current financial woos because it does not have a control of currencies and macrofinances.

# Why not Metric System in the United States?



### For example:

1 kilometer (km) = 0.62 mile (mi)  
 1 kilometer (km) = 3280.8 feet (ft)  
 1 meter (m) = 3.28 feet (ft)  
 1 centimeter (cm) = 0.39 inch (in)  
 1 millimeter (mm) = 0.039 inch (in)  
 1 inch (in) = 2.54 centimeters (cm)  
 1 inch (in) = 25.4 millimeters (mm)  
 1 foot (ft) = 0.30 meter (m)  
 1 yard (yd) = 0.91 meter (m)  
 1 yard (yd) = 0.00091 kilometer (km)  
 1 mile (mi) = 1.61 kilometers (km)

### The fraction would be:

$\frac{1 \text{ kilometer (km)}}{0.62 \text{ miles (mi)}}$	$\frac{\text{(numerator)}}{\text{(denominator)}}$
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- The United States is sticking to the English system because the costs of converting everything to the Metric system outweigh the potential benefits from adopting it.

<http://www.learner.org/interactives/metric/length2.html>

<http://www.sodahead.com/living/should-the-us-switch-to-the-metric-system/question-1180989>



## How is a USPS delivery truck different from a standard delivery van?



- Why does USPS use this one?
- What if there is a law banning the use of this kind of customized delivery trucks?

# Why do wall street bankers and soldiers wear uniforms, and why don't silicon valley geeks?



<http://www.telegraph.co.uk/finance/financialcrisis/4593262/Wall-Street-bankers-forced-to-eat-humble-pie.html>  
<http://www.demotix.com/news/490138/greek-military-parade-thessaloniki#media-490223>  
<http://www.timesfreepress.com/news/2012/sep/10/silicon-valley-isnt-sharing-facebooks-misery/>

## Standard in Our Life (3/3)

- What are the benefits from a standard?
  - Standards are one of the most essential foundations for orders in our daily lives.
- What would be the costs in having a standard? By having a standard, we are losing what?
  - Standards restrain *flexibility and control* of everyone subject of the standards.
  - Standards may also stifle innovation by limiting the behaviors and thoughts of subjects.



- Why do the transit agencies in the DC area adopt SmarTrip for a common standard payment system?
- What would be the reasons that a transit agency does NOT adopt SmarTrip?

## **SmarTrip – Standard Payment System**

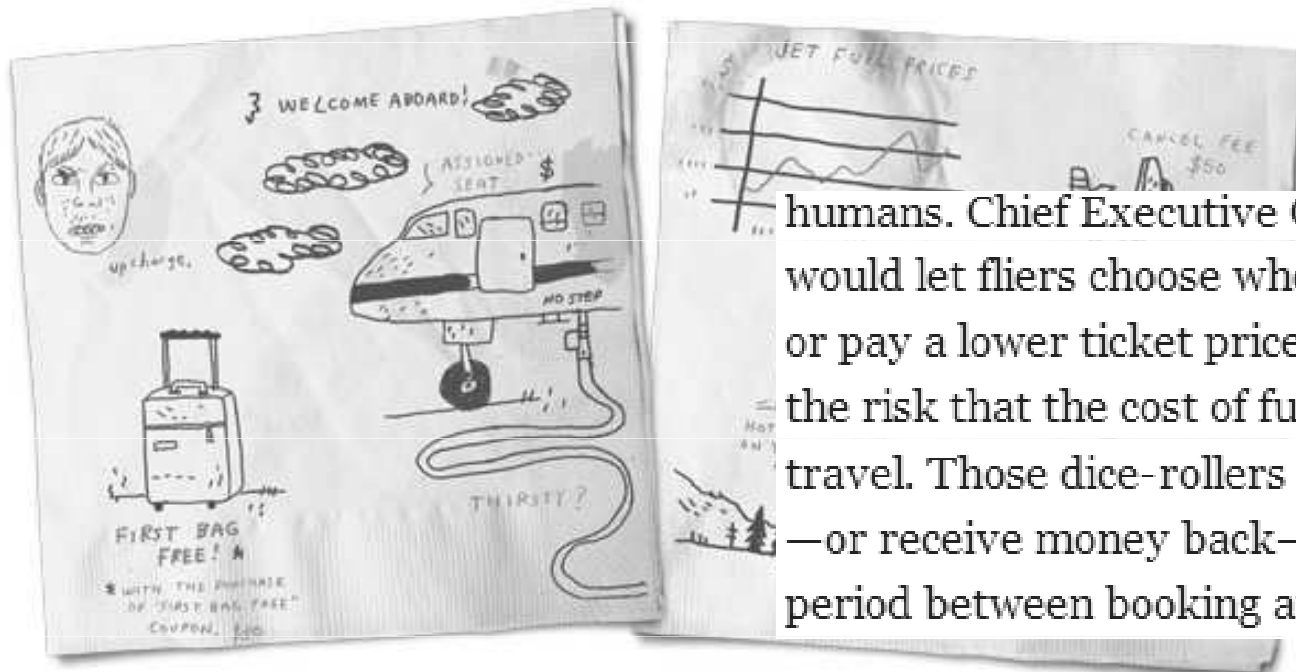
- By joining in SmarTrip, the transit agencies can save costs in operating their own payment system.
  - Consumers do not need to deal with multiple payment means. The transit agencies can have a large customer base.
- By joining in SmarTrip, the transit agencies lose some part of control in managing payment systems.
  - Suppose that one agency wants to introduce a new discounted fare for students. It would have to coordinate with other agencies.
  - It would be slower and inefficient to implement the discount than when it has a separate payment system.

# Flexibility in IT (1/2)

**Bloomberg  
Businessweek**

Travel

## An Airline That Wants You to Pay for the Gas



humans. Chief Executive Officer Maurice Gallagher Jr. would let fliers choose whether to lock in a set, higher fare or pay a lower ticket price in exchange for shouldering the risk that the cost of fuel may increase before they travel. Those dice-rollers would pay an additional amount—or receive money back—if energy costs changed in the period between booking and flying. Says Gallagher: “We’ll

says Allegiant would need six to 12 months to build the technology into its website and potentially longer than



**allegiant**  
air®

<http://www.businessweek.com/articles/2012-09-25/this-airline-wants-you-to-buy-the-jet-fuel>  
<http://www.sunshinefoundation.org/allegiantfamilies.html>

## **Flexibility in IT (2/2)**

- IT Adventures Chapter 16
- A phone company in the 1990s had begun to offer a new “Friends and Family” calling plan that allowed people to call a specific handful of people for free; competitors, because of the evolved complexity of billing systems, had been unable to respond with similar plans for many months, and had lost big chunks of market share during that time.

# Killing Complexity



From: [www.cio.com](http://www.cio.com)

## CIOs In Search of IT Simplicity

– Kim S. Nash, CIO

**June 28, 2012**

### 'Killing Complexity'

Complexity is slow, expensive and not secure. If systems are difficult to use, employees get flummoxed, wasting work time searching for functions or waiting for help. Multiply that lost time by thousands of employees, and entire companies slow down. When a new business opportunity or a chance to beat a competitor comes along, you can't move fast enough or don't have the funds to invest. (See "[CIOs Seeking System Interfaces That Are 'Apple-Simple'.](#)")

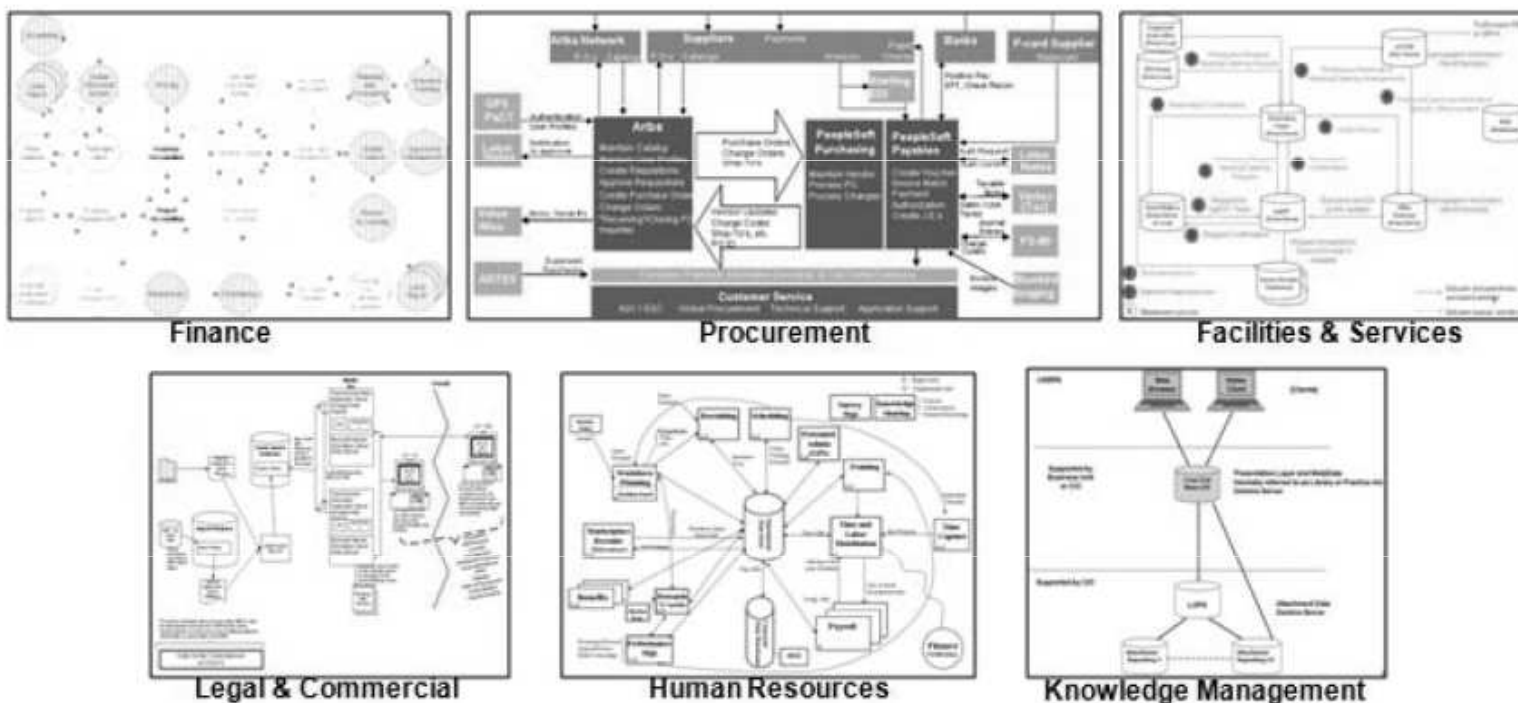
J.C. Penney's new COO Michael Kramer complained to Wall Street recently that he discovered the company runs 492 applications, 88 percent of which are custom. He thinks it should be running about 100 apps, total. "It's a mess," he said. The troubled retailer, which lost \$152 million last year on sales of \$17 billion, plans to simplify IT as part of a massive transformation project. "When you want to make a change in the business, it takes a lot of un-layering and putting back on," Kramer said. "That costs money."



# IT Complexity at IVK and Accenture (1/2)

## Exhibit 2: Accenture IT Systems Prior to the Transformation

Each capability had a distinct IT architecture; the 2,000+ applications had no overall enterprise architecture and were siloed in functional areas.



- Why have IT systems at IVK and Accenture gotten so complex?

## IT Complexity at IVK and Accenture (2/2)

- The IT systems at IVK and Accenture have gotten complex
  - because the business units (Bus) have been able to adopt any kind of technologies they wanted.
  - The BUs adopted the technologies not for the overall company's interests, but for its self interests.
  - The IT groups had have little power to contain this proliferation of IT complexity.
- Exacerbated complexity in IT holds back implementation of strategic initiatives (as in Allegiant Air and J.C. Penny) and thus undermines *agility and competitiveness* of enterprises.

## **Benefits of Standardization**

- When there is freedom, employees and business units are using different kinds of ITs, whatever they want.
  - Some employees want to use PC/Blackberry and others want Mac and iPhone.
  - Some business units are using Oracle database, while others are using Microsoft SQL.
  - Some regional sales offices are using SAP ERP, while others are using Salesforce.com, a cloud-based CRM software.
- What are the problems in this case?
  - Lost of flexibility of individual business units

## Costs of Standardization

- What if the CIO or the CEO forces
  - all employees to use PC and Blackberry, not Mac and iPhone
  - all business units to use Oracle database
  - all regional sales offices to use Salesforce.com.
- What are the problems in this case?
  - Individual business units/sales offices lose their control in their choice of technologies.
  - Some BUs may have a reason to use different technologies. With standards, they have to sacrifice flexibility they need.
  - Therefore, they will resist being imposed of the standards.

## Economics of Standardization (1/2)

- Accenture case mentions about “economies of scale for the company?” What does it mean?
- By standardizing enterprise architecture and becoming *a big customer*, Accenture can have greater bargaining power against IT vendors and enjoy lower prices per license.
- What are the other risks in having one or a few IT vendors for standardized IT architecture?
  - If Accenture becomes too dependent upon the few vendors for many years, it will lose some bargaining power over the vendors because of *switching costs*.



# Guide to Microsoft Volume Licensing

For organizations with 250 or more desktop PCs, Microsoft offers the following options:

- ▶ **Microsoft Select Plus** is for midsize and large organizations with 250 or more desktop PCs with multiple affiliates that want to license software and services at any business unit level while still getting the price saving advantages of being a single organization.
- ▶ **Microsoft Enterprise Agreement (EA)** is for larger organizations that want to standardize their desktop IT across the enterprise, but retain the flexibility to purchase Microsoft software licenses and cloud services for different types of users. Based on a three-year enrollment term, it provides the deepest pricing discounts and the advantages of Software Assurance.

## Enterprise Agreement Key Attributes

At the onset of the agreement, pricing is based on a tiered volume discount structure, meaning the greater the size of your organization, the less you pay for an individual per-desktop or per-user license. If you add devices during your agreement, the per-device licensing costs remain the same or may be reduced given the EA's volume pricing levels during your three-year agreement term.

The following are four price levels for each of the enterprise products:

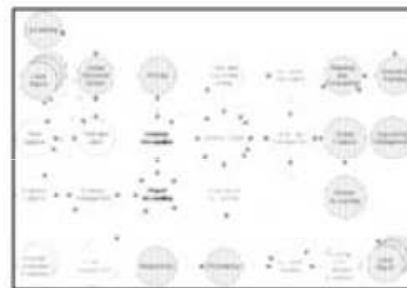
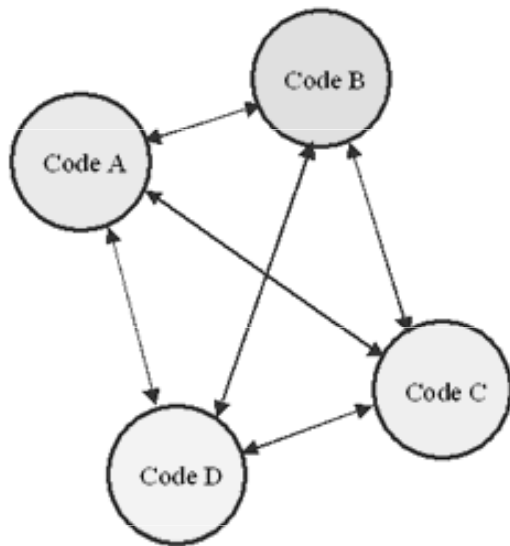
Price level	Desktop PCs
A	250–2,399
B	2,400–5,999
C	6,000–14,999
D	15,000 or more

## Economics of Standardization (2/2)

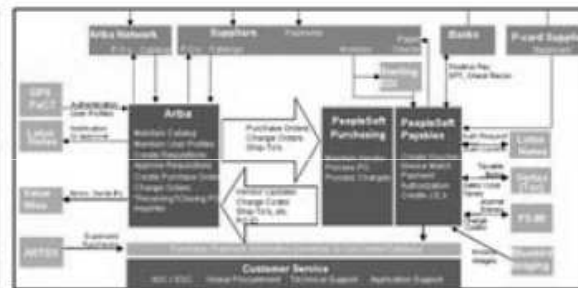
- Economies of scale in terms of IT specialists
- Suppose one business unit uses Oracle database, while another business unit operates Microsoft SQL database.
  - They have to hire three Oracle specialists and three MS SQL specialists
- What if the two units come together to adopt Oracle database.
  - They will be able to hire four or five Oracle specialists.

# Coupling between IT Systems (1/3)

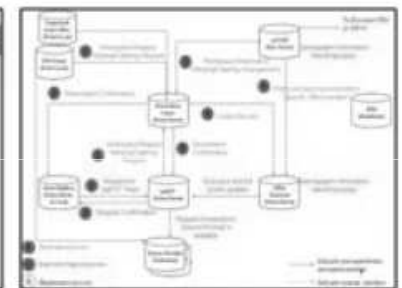
- What does it mean by coupling in IT systems?
- Can the procurement system at Accenture function without talking to the finance system?
  - What if the two systems use different types of databases?



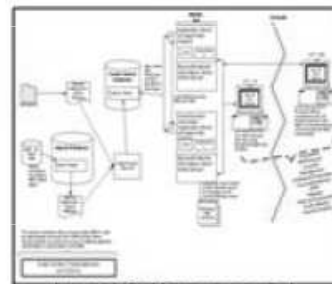
Finance



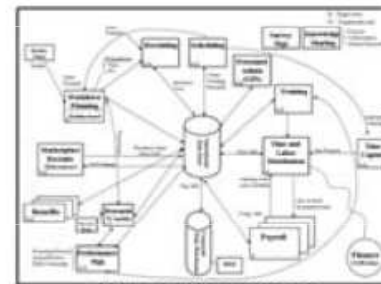
Procurement



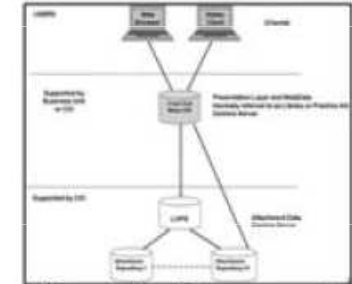
Facilities &amp; Services



Legal &amp; Commercial



Human Resources



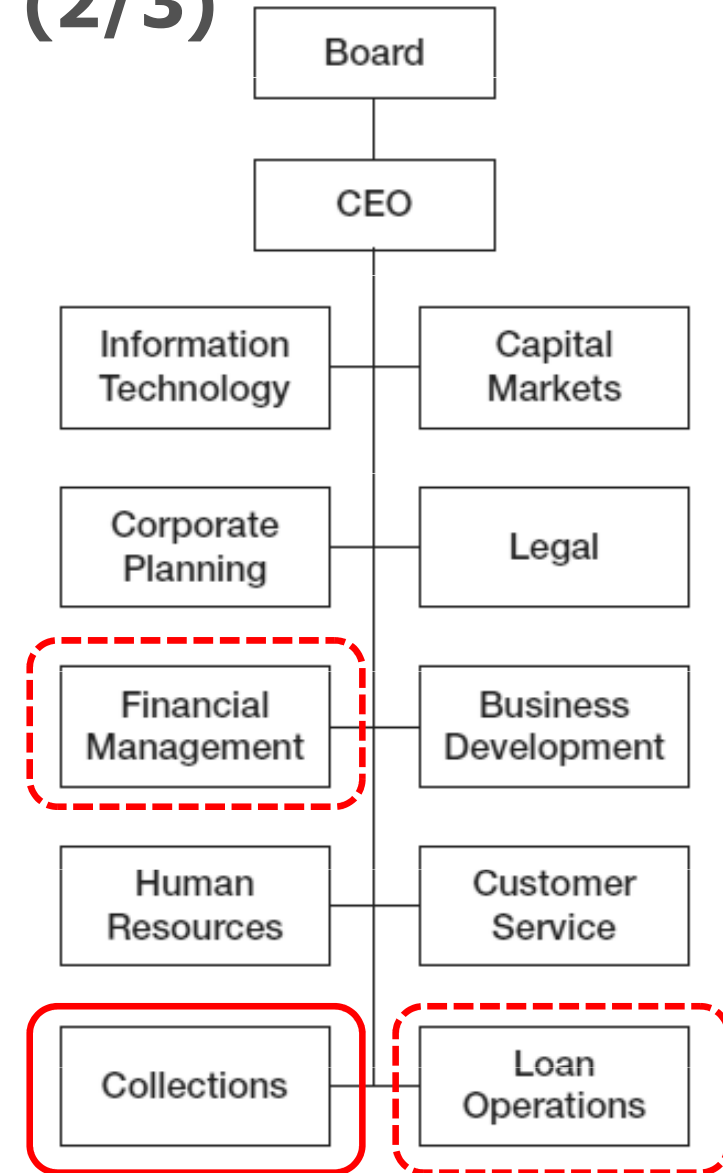
Knowledge Management

<http://www.testically.org/2010/09/20/how-tight-code-coupling-affects-your-work-and-team-organisation/>



## Coupling between IT Systems (2/3)

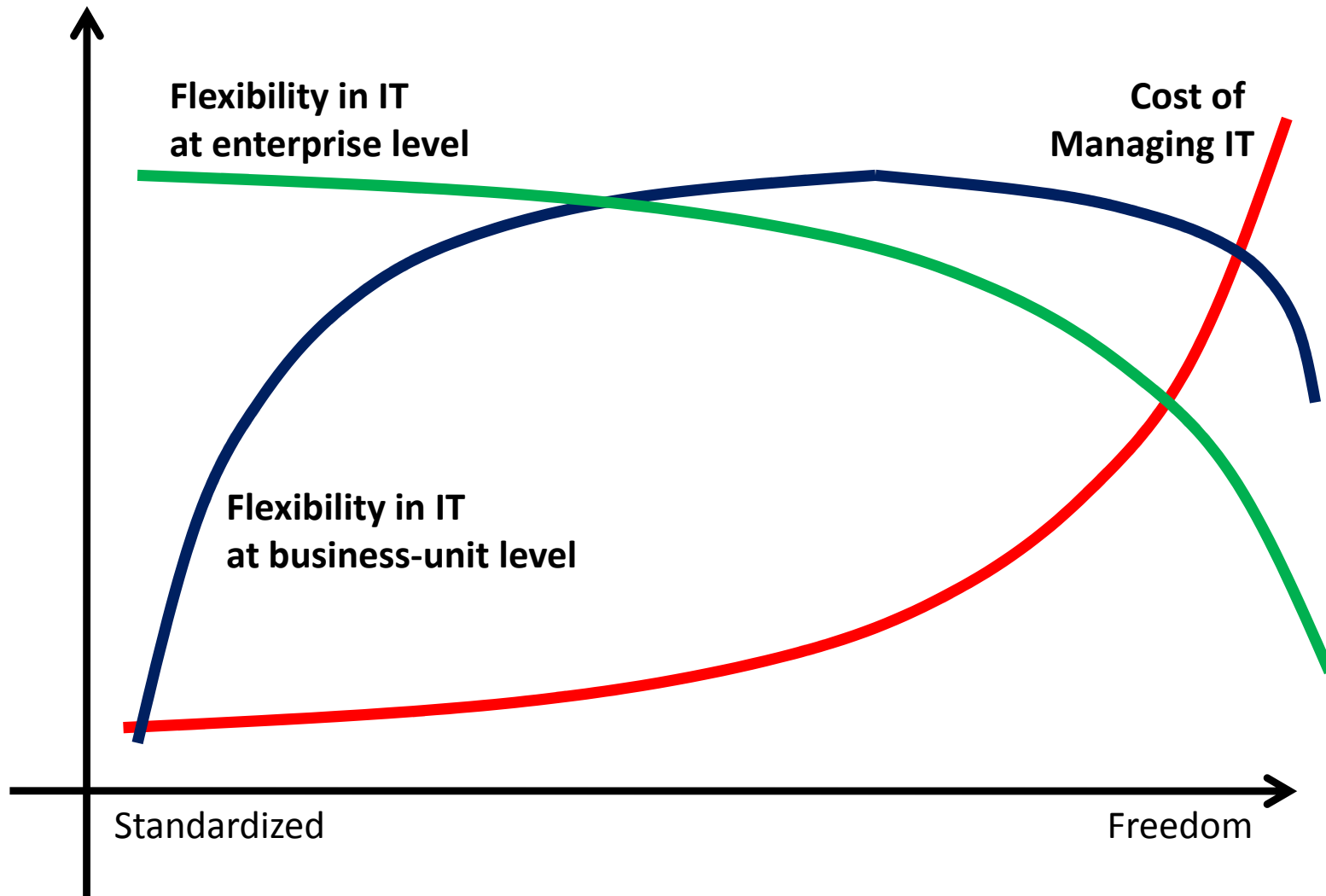
- Can the collections system at IVK be up-and-running without communicating with the loan operation system or the financial/accounting system?
- What if each of the systems uses different operating systems, different databases, and different data format?
  - What does IVK can do?



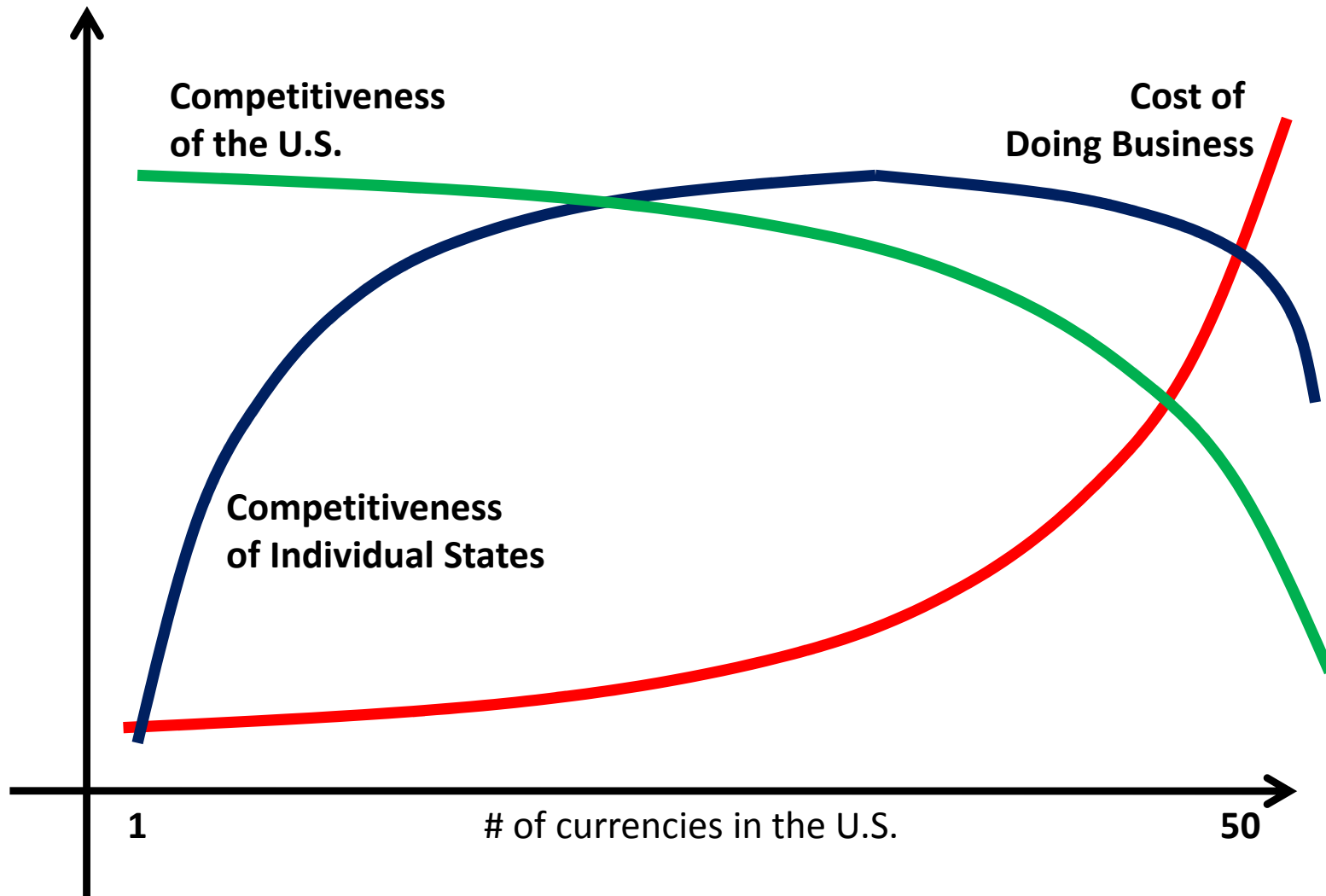
## **Coupling between IT Systems (3/3)**

- No system in an organization operates alone. Every system (e.g. purchasing, finance, or collections) has to communicate with each other for proper functioning.
- Even with different underlying technologies, each system can still function and communicate, but not in an effective, real-time manner.
  - With incompatible technologies, two systems have to have a bridge or a converter acting as a translator between the two.
  - A converter is expensive to develop and maintain but does not add any value to the system.

# Tradeoff with Standard and Freedom (1/3)



# Tradeoff with Standard and Freedom (2/3)



## Tradeoff with Standard and Freedom (3/3)

- Imposing standards across the organization reduces costs in managing IT systems (better licensing/price, fewer staff, and fewer converters).
- Imposing the standards limits flexibility or innovation within individual business units.
  - Too much freedom, however, hurts flexibility of individual BUs since maintaining coupling between the systems becomes very expensive.
- Too much freedom also undermine strategic flexibility and agility from the overall enterprise perspective.

## Consideration in Enterprise Architecture (1/2)

- IVK : Voluntary Compliance vs. Strict Enforcement
- Accenture : Best-of-Breed vs. One-Platform
- If these only two choices are available, how to choose either of them? What should be consideration?
- How about “Compete” vs. “Qualifier”?
  - If IT is Qualifier, One-Platform is the preferred choice since it reduces the costs in operating IT.
  - If IT is Compete, Best-of-Breed may be more desired since it ensures flexibility in individual business units.

## Consideration in Enterprise Architecture (2/2)

- How about industry characteristics?
  - If you are in a stable, mature industry, IT is Qualifier, and thus One-Platform (Strict Enforcement) is a better choice.
  - If you are in a dynamic, growing industry, IT is Compete, and thus, Best-of-Breed is preferred.

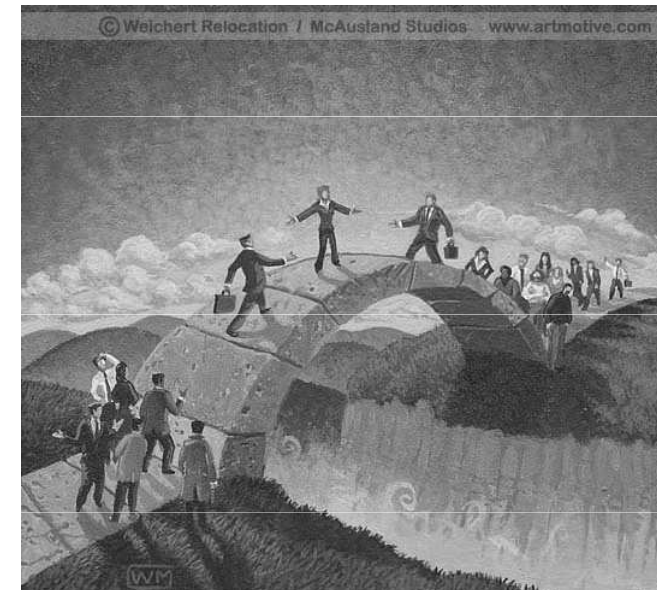
## Another Issue – What Can Mr. Barton Do?

- IVK : Voluntary Compliance vs. Strict Enforcement
- Between these two, which one does Mr. Barton prefer?
- Then, why doesn't he go for Strict Enforcement?
  - How long and how much would it take for IVK to completely standardize its complex IT systems? *Substantial.*
  - Will he be able to “enforce” the IT standard *strictly* across IVK?
  - Does he have enough political power to do so?
  - No and no.



## Any middle ground or compromise?

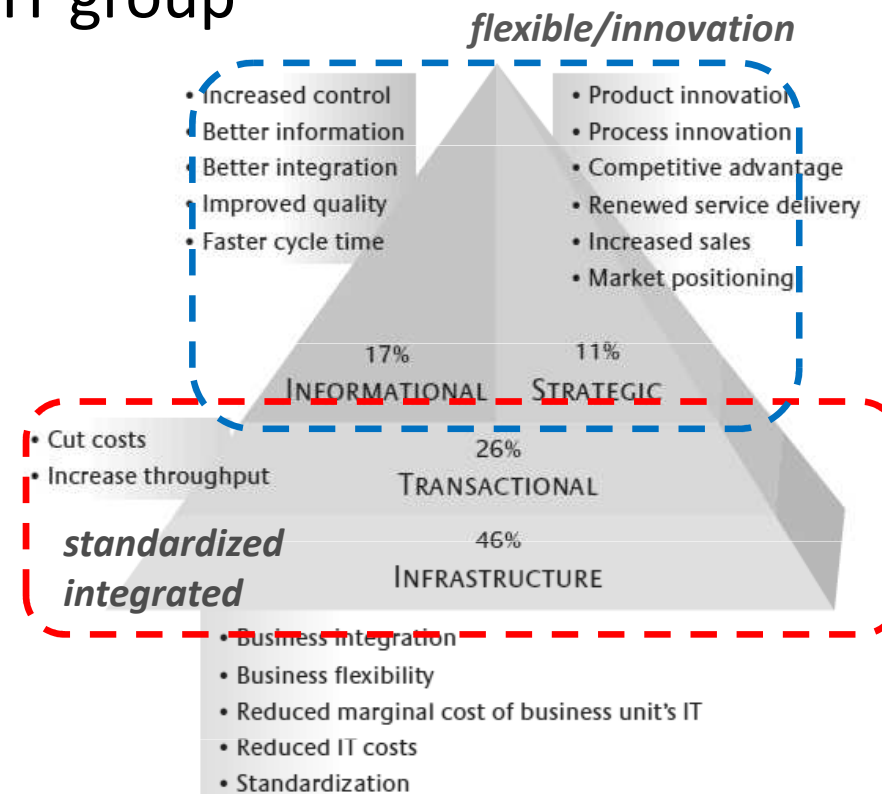
- IVK : Voluntary Compliance vs. Strict Enforcement
- Accenture : Best-of-Breed vs. One-Platform
- Are these two the only choice?
- What is the “Gradual Migration” approach that Mr. Barton proposes?
  - Emerging technologies
  - Declining technologies
  - Standard technologies



<http://www.mcauslandstudios.com/illustration-Middle-Ground.htm>

# Platform Approach with Public/Private Goods

- Remember the public/private goods discussion?
- On top of standardized, integrated infrastructure (with/without transactional system) in charge of the IT group
- flexible informational and strategic systems that reflect unique needs of business units.
- This approach can pursue both simplicity and flexibility at the same time.



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

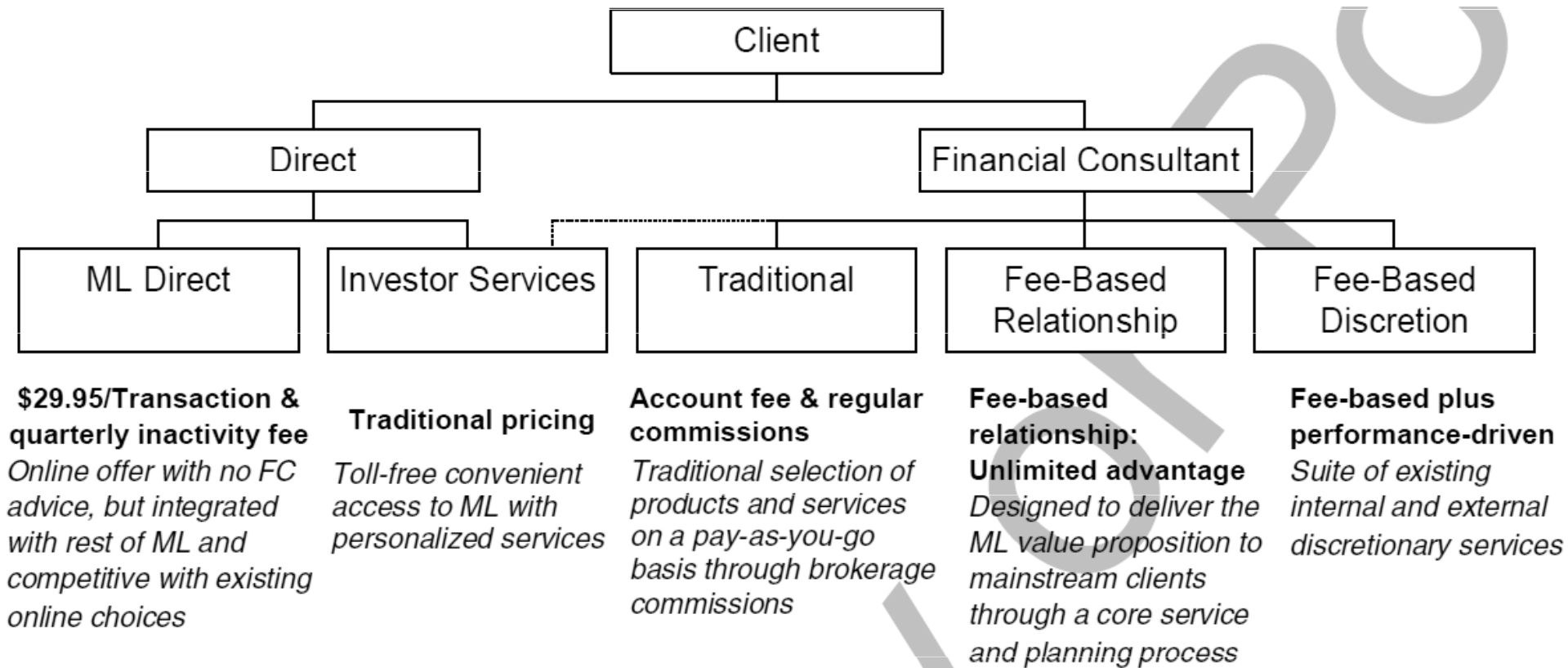
## Four operating models

<b>Data Standardization</b>	<b>Business Process Integration</b>	<b>High</b>	<p style="text-align: center;"><b>Coordination</b></p> <ul style="list-style-type: none"> <li>■ Unique business units with a need to know each other's transactions</li> <li>■ <b>Examples:</b> Commonwealth Bank of Australia, MetLife, Aetna</li> <li>■ <b>Key IT capability:</b> access to shared data, through standard technology interfaces</li> </ul>	<p style="text-align: center;"><b>Unification</b></p> <ul style="list-style-type: none"> <li>■ Single business with global process standards and global data access</li> <li>■ <b>Examples:</b> Southwest Airlines, Dow Chemical, UPS Package Delivery</li> <li>■ <b>Key IT capability:</b> enterprise systems reinforcing standard processes and providing global data access</li> </ul>
	<b>Low</b>	<p style="text-align: center;"><b>Diversification</b></p> <ul style="list-style-type: none"> <li>■ Independent business units with different customers and expertise</li> <li>■ <b>Examples:</b> Johnson &amp; Johnson, Pacific Life, ING</li> <li>■ <b>Key IT capability:</b> provide economies of scale without limiting independence</li> </ul>	<p style="text-align: center;"><b>Replication</b></p> <ul style="list-style-type: none"> <li>■ Independent but similar business units sharing best practice</li> <li>■ <b>Examples:</b> Marriott, 7-Eleven Japan, ING DIRECT</li> <li>■ <b>Key IT capability:</b> provide standard infrastructure and application components for global efficiencies</li> </ul>	
			<b>Low</b>	<b>High</b>
<b>Business Process Standardization</b>				

# Enterprise Architecture Operating Models

- Source : J. Ross, “Enterprise Architecture: Driving Business Benefits from IT,” MIT Center for Information Systems Research
- Business Process Standardization: business units have the same, integrated business processes in production/supply chain.
- Business Process Integration (Data Standardization): business units share the same, integrated set of information on customers, products, suppliers, and so forth.

# Coordination Model – Merrill Lynch (1/2)



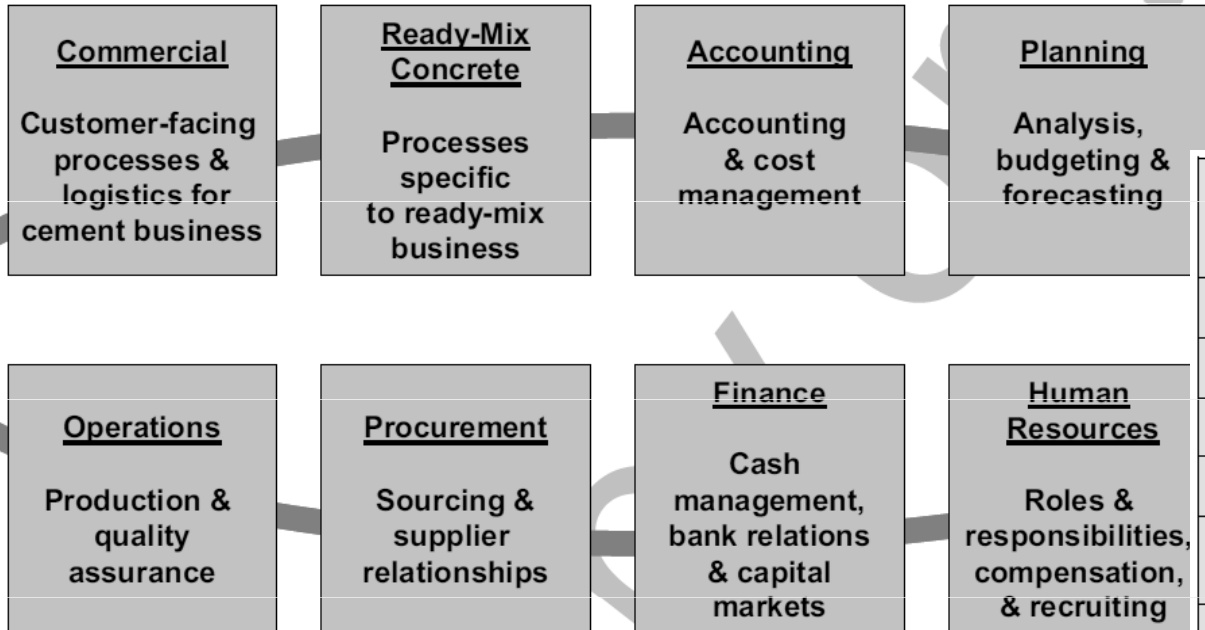
- Business units in Merrill Lynch share customer information but not business processes.

Source: Harvard Business School Case "Merrill Lynch : Integrated Choice"

## Coordination Model – Merrill Lynch (2/2)

- ML chose to integrate and standardize its data structures across business units because there are *synergies* by sharing customer information between the BUs.
  - A customer in one BU can be served by another BU.
- It chose not to standardize the business processes, because the processes are *heterogeneous* across the BUs.

# Replication Model – CEMEX (1/2)



	Annual Production Capacity	Sales
Mexico	33.4%	36.7%
Spain	13.3%	16.7%
Venezuela	5.6%	4.5%
Colombia	5.9%	3.0%
Central America & Caribbean	5.0%	7.8%
<i>Sub-total: Latin markets</i>	<i>63.2%</i>	<i>68.7%</i>
US	17.4%	24.0%
Egypt	6.0%	1.8%

- Regional subsidiaries of CEMEX share the standardized business processes in the above areas. But they do not share their data.

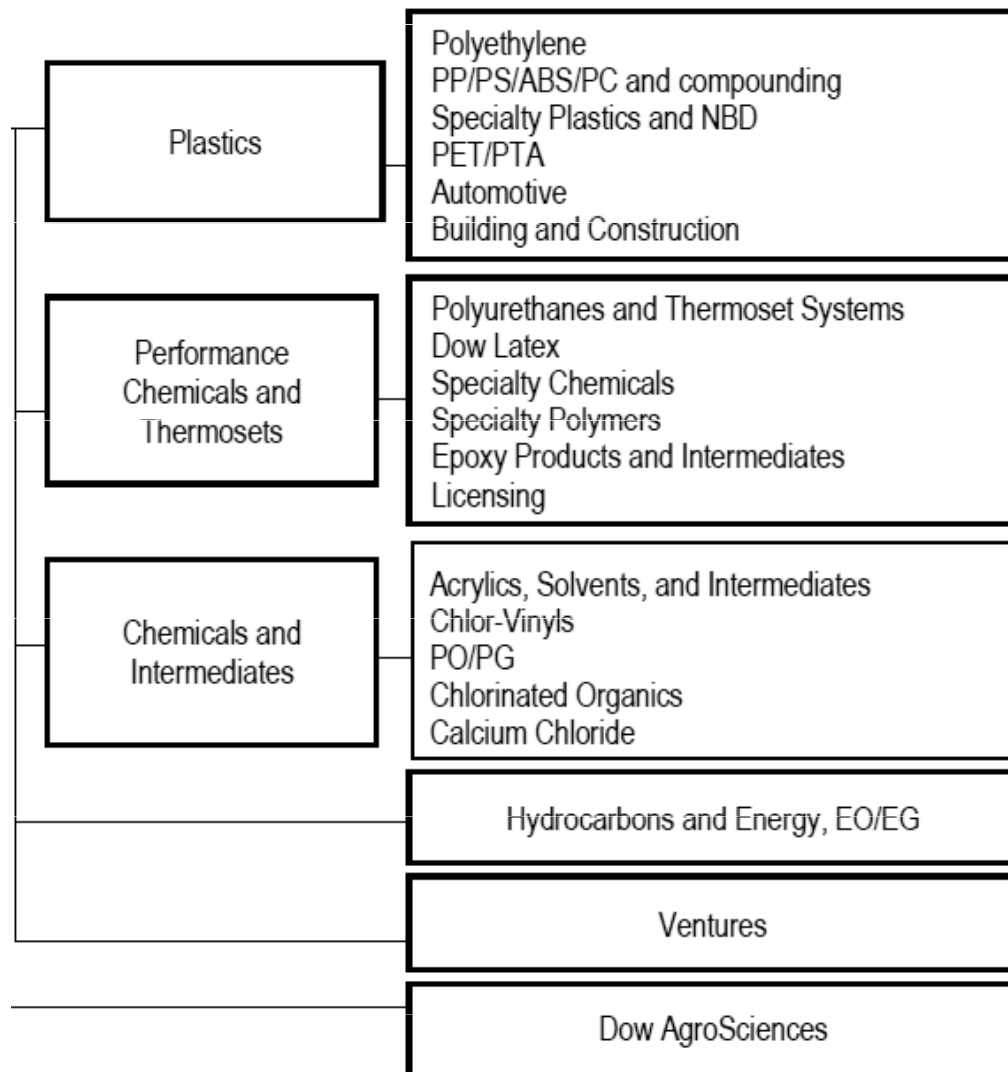
Source: IMD Institute "The CEMEX Way: The Right Balance between Local Business Flexibility and Global Standardization"

## Replication Model – CEMEX (2/2)

- CEMEX chose to standardize the business processes across international subsidiaries, because the processes are *homogenous*.
  - It could enter to a new foreign market quickly by setting up its standardized business processes in the new market.
- It chose not to integrate its data, since the potential benefits are outweighed by the costs in integration.



# Unification Model – Dow Chemical



- Business units in Dow Chemical not only follow the standardized business processes
- but share information on customers, products, operations, suppliers, and so forth.

Source: MIT Center for Information Systems Research "The Federated Broker Model at the Dow Chemical Company"

## Unification Model – Dow Chemical

- CEMEX chose to standardize the business processes across the business units, because the processes in chemical production are *homogenous*.
- It also integrated and standardized its data structures across business units because there are synergies by sharing customer information between the BUs.

## Next Week

- Strategic IT Outsourcing
- Read Chapter 7 and 14 of IT Adventures textbook and write ONE brief of up to 200 words by 5:30pm next Monday.