

WEBIST & CSEDU 2011

Noordwijkerhout, The Netherlands, 6 May 2011

***Cloud Computing in Education:
The Intersection of Challenges and
Opportunities***

Ivan I Ivanov

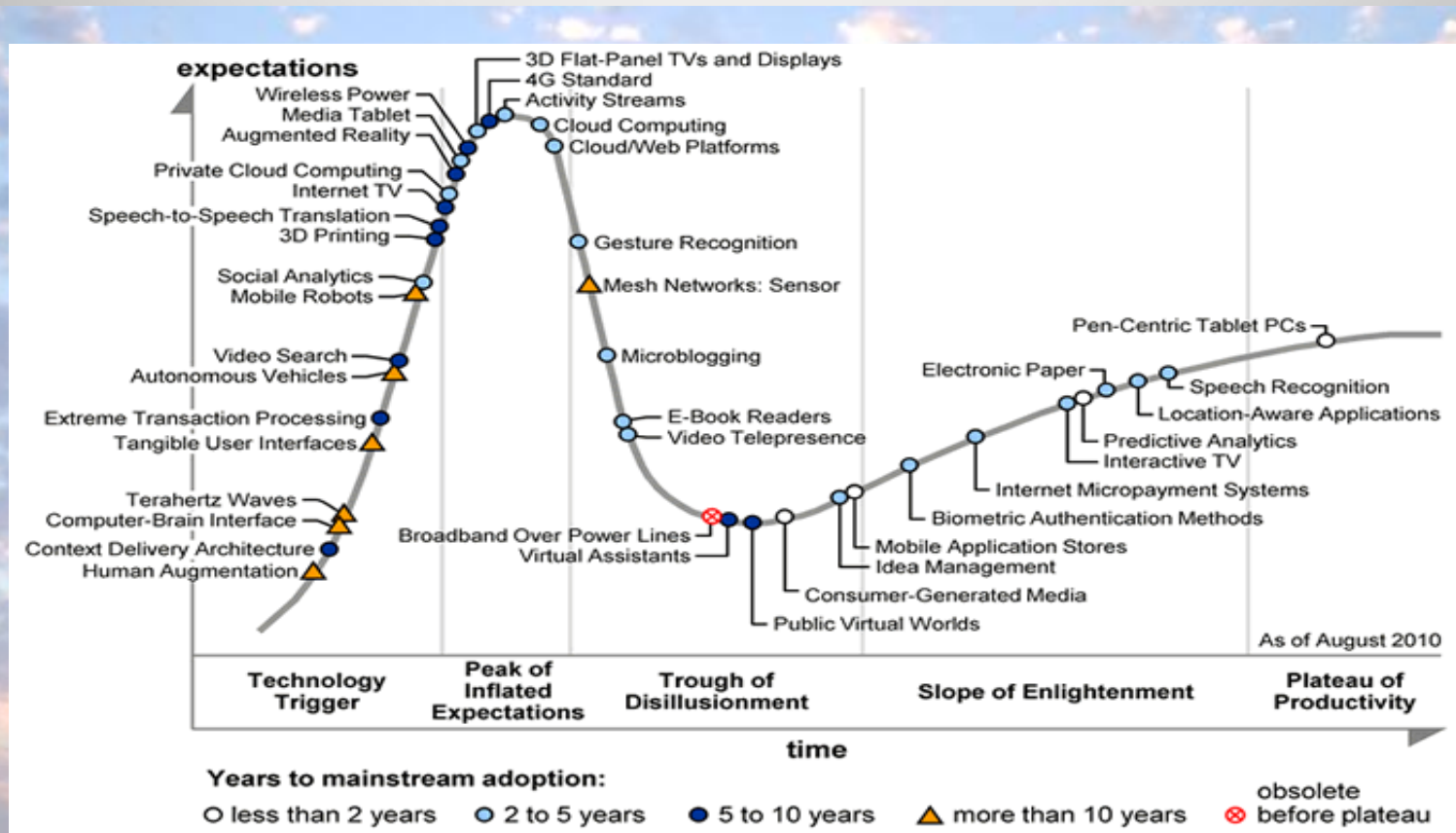
State University of New York

Empire State College, USA

Outline

- **Hype and Reality**
- **The Cloud Phenomenon**
- **The Scale of IT Changes:**
 - **IT in the Organizational Context of HEI**
 - **Deliberate IT Transformations**
- **Gaining Value of the Cloud**
- **Utilizing the Cloud, Dealing with Challenges**
- **Closing thoughts**

Hype and Reality



Source: Gartner, August 2010

The Cloud Phenomenon

- Challenges and Opportunities:
 - Cut Costs
 - Dynamic Mobile and Interactive Computational Services
 - Utilizing and Leveraging IT Infrastructures and Systems
 - Rise up to 43% by 2014

The Scale of IT Changes

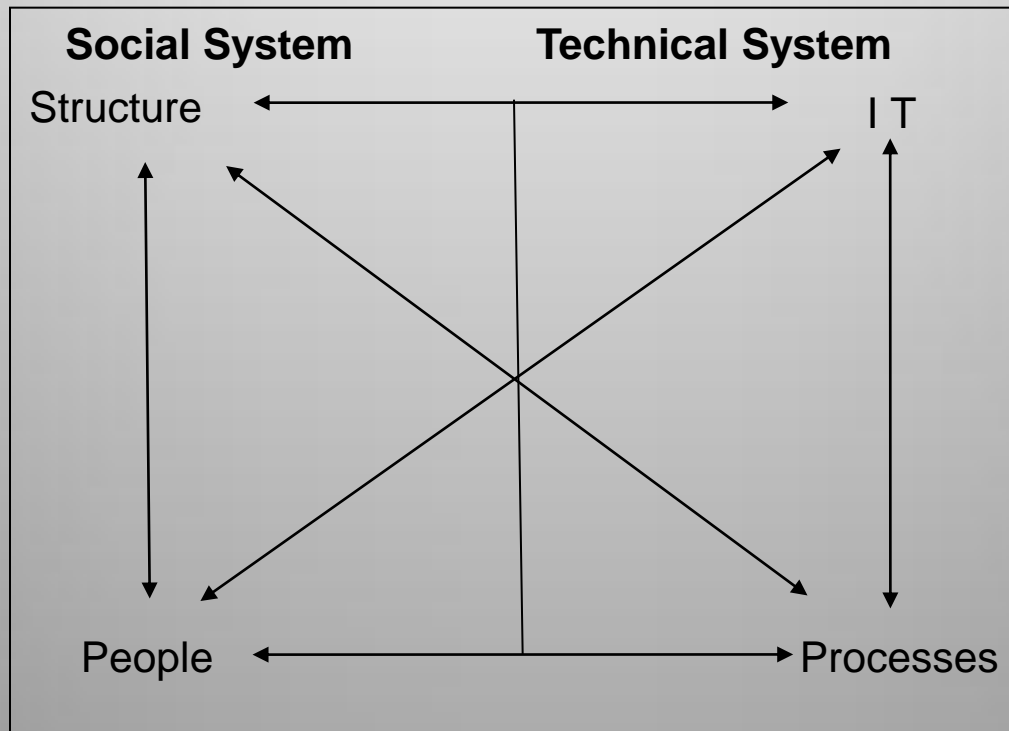
- IT in the Organizational Context of HEI
- The Core Sets of Activities in HEI
- Deliberate IT Transformations

IT in the Organizational Context of HEI

- **IT as a critical component of a Sociotechnical Information Systems:**
“... designed to collect process, store, and distribute information”
- **The four internal driving forces in the Sociotechnical model:**
 - **Social System:**
 - Structure
 - People
 - **Technical System:**
 - IT
 - Processes

IT in the Organizational Context of HEI ...

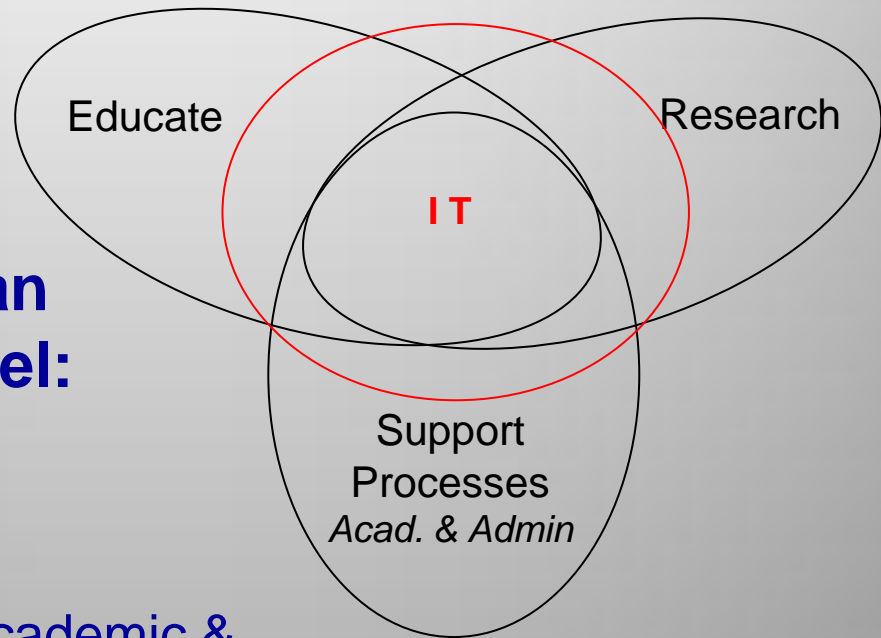
IS Sociotechnical System primary components - Piccoli, 2008



Core Sets of Activities in HEI

The three core sets at an institutional (micro) level:

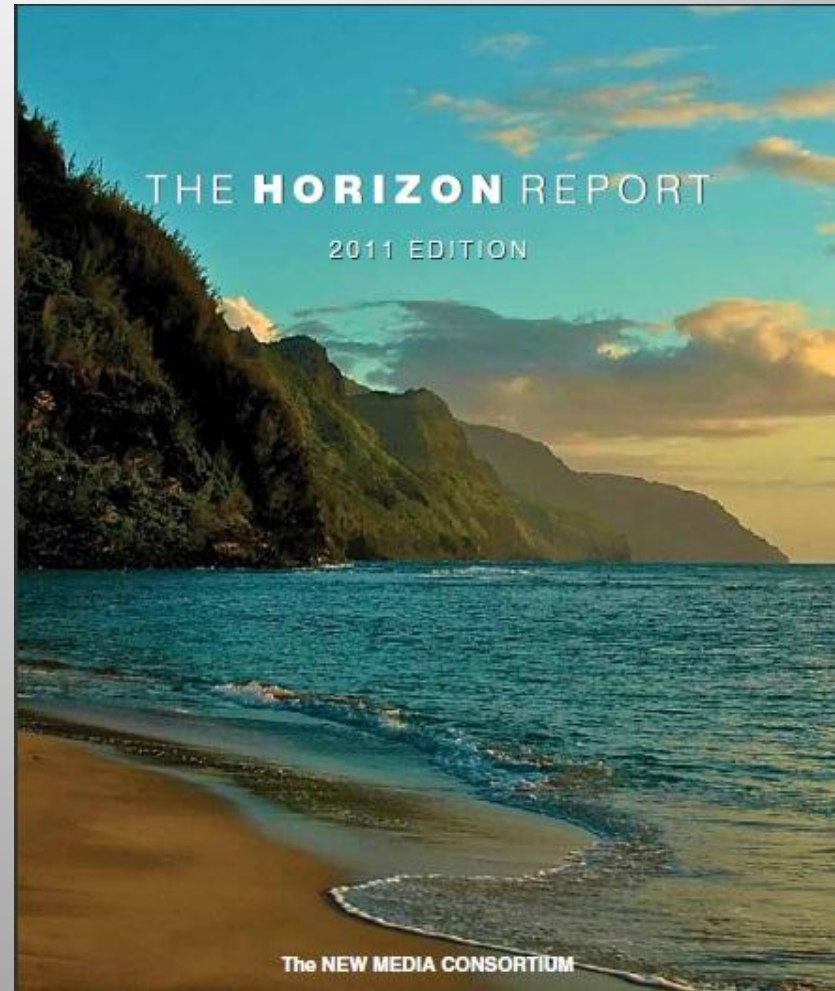
- Educate
- Research
- Support Processes (Academic & Administrative)



Key Trends and Challenges in HES

Four Key Trends:

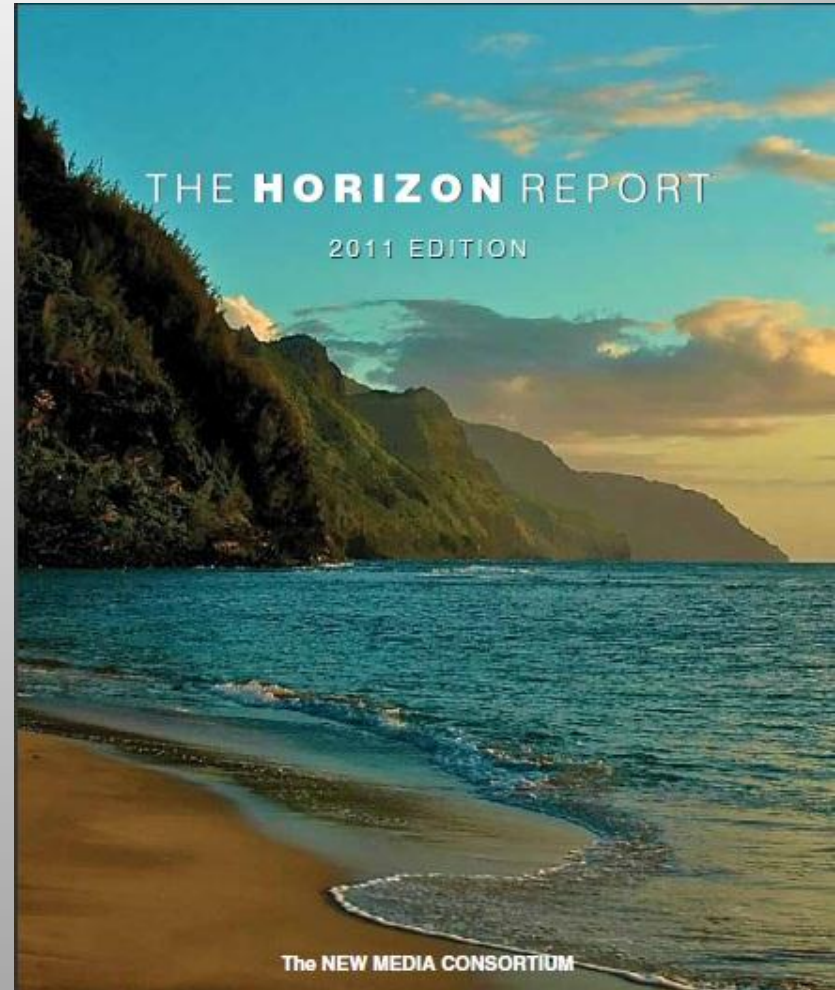
- Revisiting teaching community roles
- Work, learn and study whenever and wherever
- Mobility and E-collaboration increases world-wide
- Technologies are cloud-based, IT support is decentralized



Key Trends and Challenges in HES

Critical Tech Challenges:

- Technologies changes outpace professional and curriculum development
- New models in education catalyzed by technology advances
- Keeping pace to tech proliferation – steady task for academic community



Deliberate IT Transformations

Key Questions to Answer:

1. *“Where and How does IT adds value in the HEI?”*
 1. *Does the on-premises IT meets the needs?*
 2. *Could IT improve efficiency by virtualization?*
 3. *What the gain and troublesome effects would be if outsourcing IT, and How to:*
 1. *Measure the risk*
 2. *Control quality*
 3. *Commence “Exit strategy”*

Deliberate IT Transformations ...

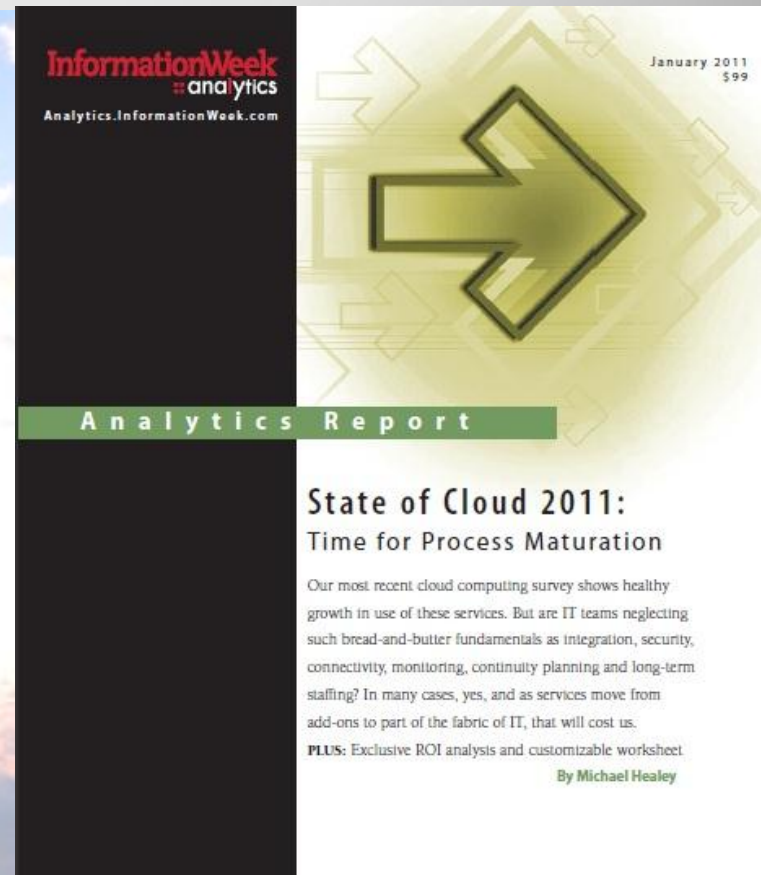
Key Questions to Answer:

2. *“What IT academic community needs to meet the growing requirements within shrinking budgets?”*
 1. *How to enhance the mobile applications?*
 2. *How fast the speed access should be?*
 3. *How to provide on-demand capacity for variety of applications?*
 4. *What system and / or model would provide cost elasticity leveraging consumption changes?*

Deliberate IT Transformations ...

Key Questions to Answer:

3. *“Would the IT advanced with **cloud architectures and cloud-based services?**”*
 - *67 % increase in organizations using Cloud services in 2011, from 18% in 2009, and 30% in 2010*
 - *13% more plan to use in the next 12 months*



The image shows the cover of a report titled "State of Cloud 2011: Time for Process Maturation". The cover features a large, stylized green arrow pointing right, set against a background of circuitry and data lines. The text on the cover includes the "InformationWeek analytics" logo, the URL "Analytics.InformationWeek.com", the date "January 2011" and price "\$99", and the title "Analytics Report". Below the title, the report title "State of Cloud 2011: Time for Process Maturation" is displayed, followed by a short summary of the report's findings and the author's name, "By Michael Healey".

InformationWeek
analytics
Analytics.InformationWeek.com

January 2011
\$99

Analytics Report

**State of Cloud 2011:
Time for Process Maturation**

Our most recent cloud computing survey shows healthy growth in use of these services. But are IT teams neglecting such bread-and-butter fundamentals as integration, security, connectivity, monitoring, continuity planning and long-term staffing? In many cases, yes, and as services move from add-ons to part of the fabric of IT, that will cost us.

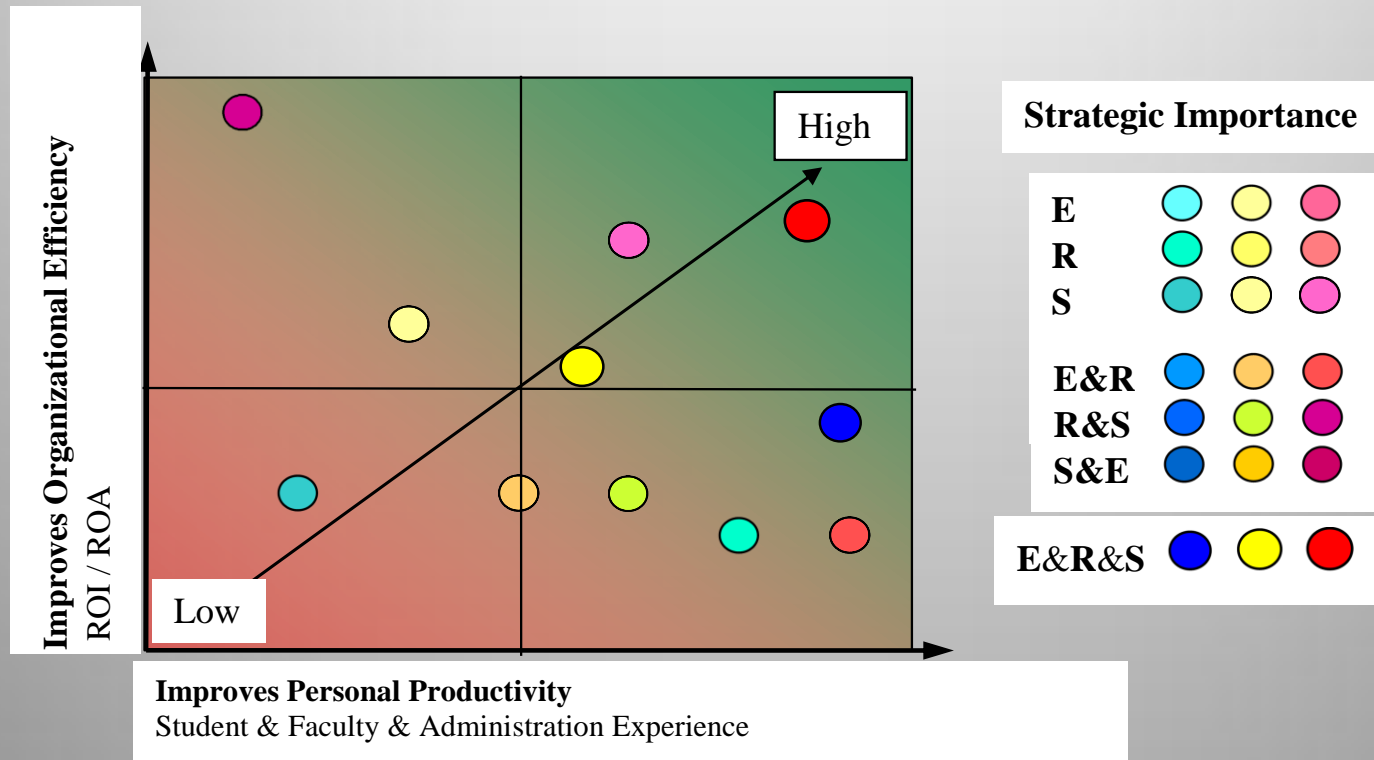
PLUS: Exclusive ROI analysis and customizable worksheet
By Michael Healey

Deliberate IT Transformations ...

Key Questions to Answer:

3. *“Would the IT advanced with **cloud architectures and cloud-based services**?
When and How?”*
 1. *How and When cloud services deliver strategic value?*
 2. *How to ward of security threats?*
 3. *How to address integration complexities and how to avoid interoperability clashes?*

Deliberate IT Transformations ...



IT Strategy Map

Gaining Value of the Cloud

NIST five core characteristics:

- *On-demand services*
- *Broad network access*
- *Resource pooling*
- *Rapid elasticity*
- *Measured services*

Gaining Value of the Cloud ...

Additional favorable advances:

- *Lower costs*
- *Ease of utilizations*
- *Quality of Services*
- *Reliability*
- *Simplified maintenance and upgrades*
- *Low Barrier to Entry*

Gaining Value of the Cloud ...

Comfort with and Resistance to Cloud Initiatives:

Executives:

- *Economic factors*
- *Better services*
- *Increased productivity*

IT Professionals:

- *Work with the latest technologies*
- *Be more efficient*
- *Improve customer services*

WHITE PAPER
The Arrival of Cloud Thinking | November 2010

The Arrival of “Cloud Thinking”

How and Why Cloud Computing Has
Come of Age in Large Enterprises



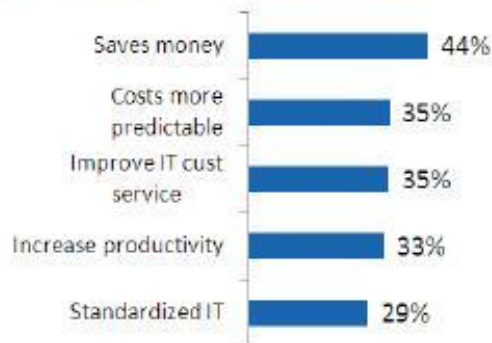
Lee Black, Jack Mandelbaum, Indira Grover, Yousuf Marvi
Management Insight Technologies

Sponsored by: ca
technologies

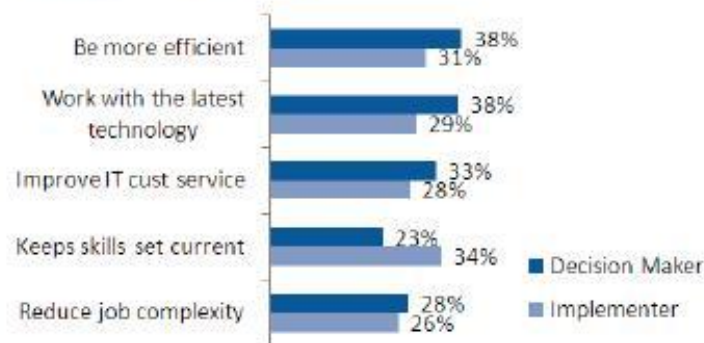
Gaining Value of the Cloud ...

Why Execs and IT Pros support Cloud Initiatives

Why IT Executives invest in cloud Initiatives...

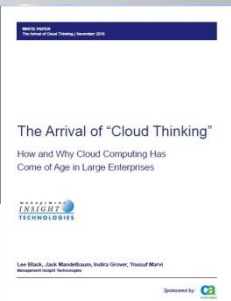


Why IT Staff support cloud initiatives...



Which factors best explain why IT executives would invest in cloud initiatives for their companies?
What are the primary reasons why hands-on IT staff would support cloud initiatives? ? N=434
Management Insight Technologies

Source: Management Insight Technologies, September 2010



Gaining Value of the Cloud ...

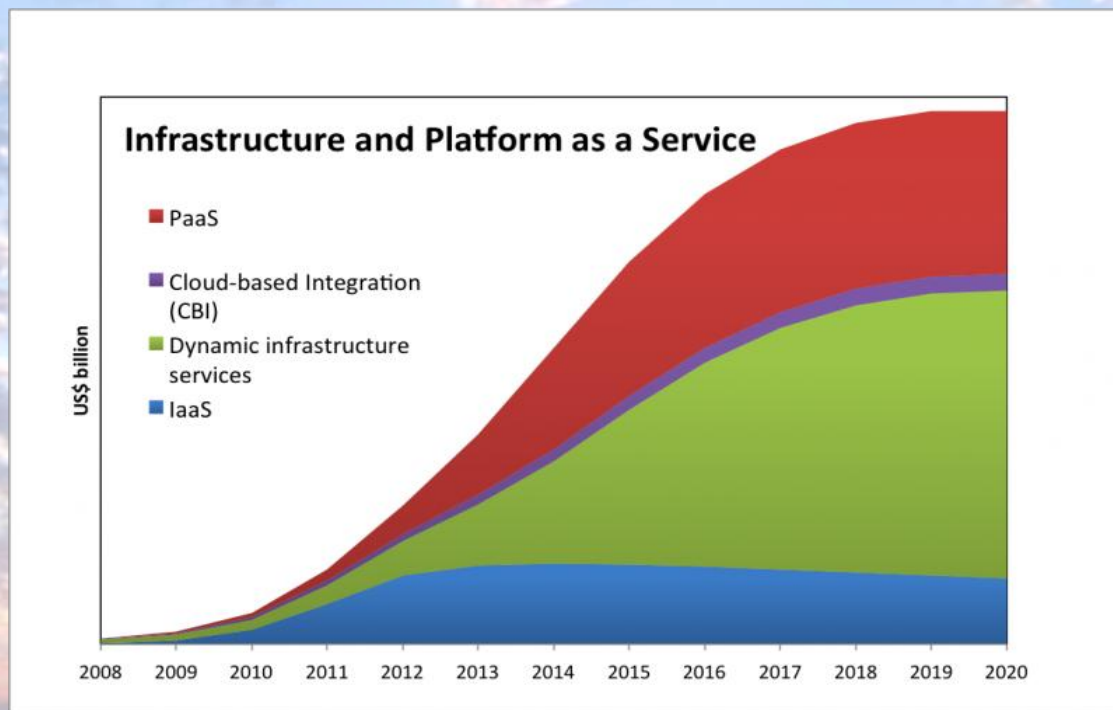
Cloud categories' positioning:

- SaaS - *the largest category with \$21.2 bil in 2011, from the total of \$25.5 bil; expecting grow to \$92.8 bil in 2016 – 26% of the SW market.*
- PaaS – *third largest with \$820 mil in 2011, expecting substantial rise from 2012 on.*
- IaaS - *the second largest with \$2.9 bil in 2011, expecting rise to mid 2010s and stay stable later on.*

Forrester Report 2011 – “Sizing the Cloud”

Gaining Value of the Cloud ...

Cloud categories' positioning



Forrester Report 2011 – “Sizing the Cloud”

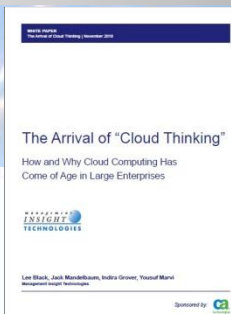
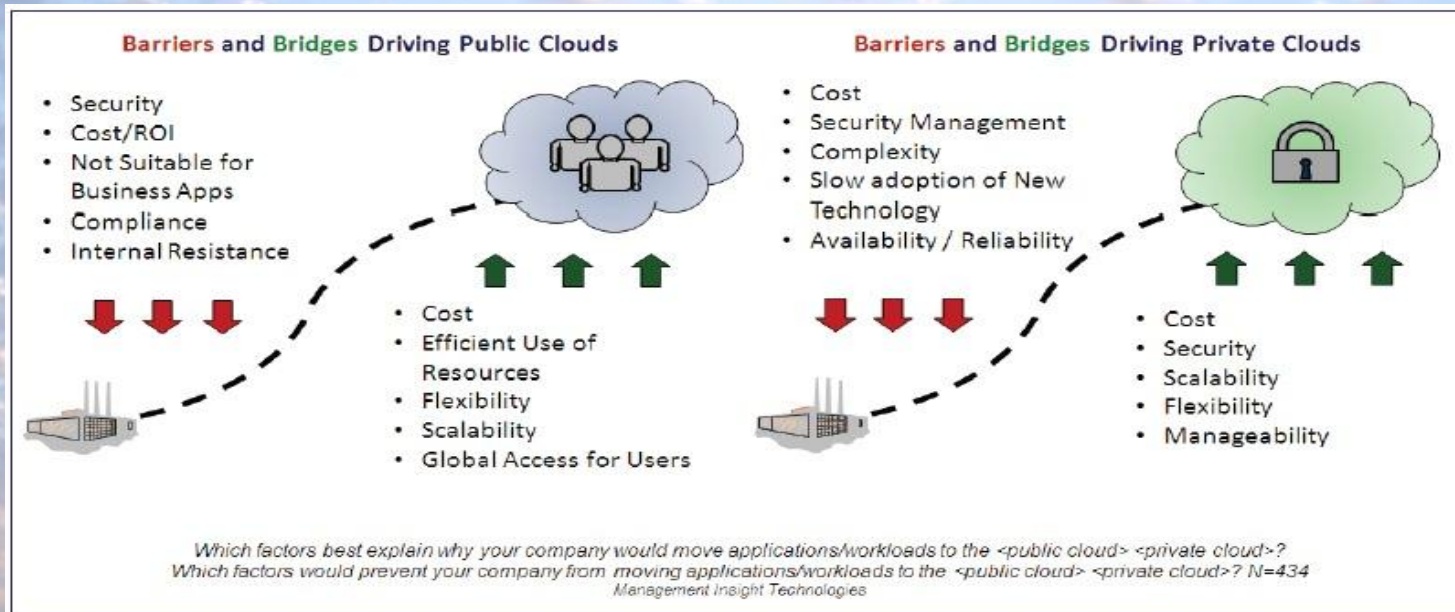
Gaining Value of the Cloud ...

NIST four Deployment Models specified in two types – *internal* and *external*:

- **Private cloud** - *the cloud infrastructure is owned or leased by a single organization.*
- **Community cloud** - *the cloud infrastructure is shared by several organizations that has shared concerns.*
- **Public cloud** - *the cloud infrastructure is owned by an organization selling cloud services.*
- **Hybrid cloud** - *the cloud infrastructure is a composition of two or more clouds that remain unique entities*

Gaining Value of the Cloud ...

Barriers & Bridges driving Public vs. Private Cloud

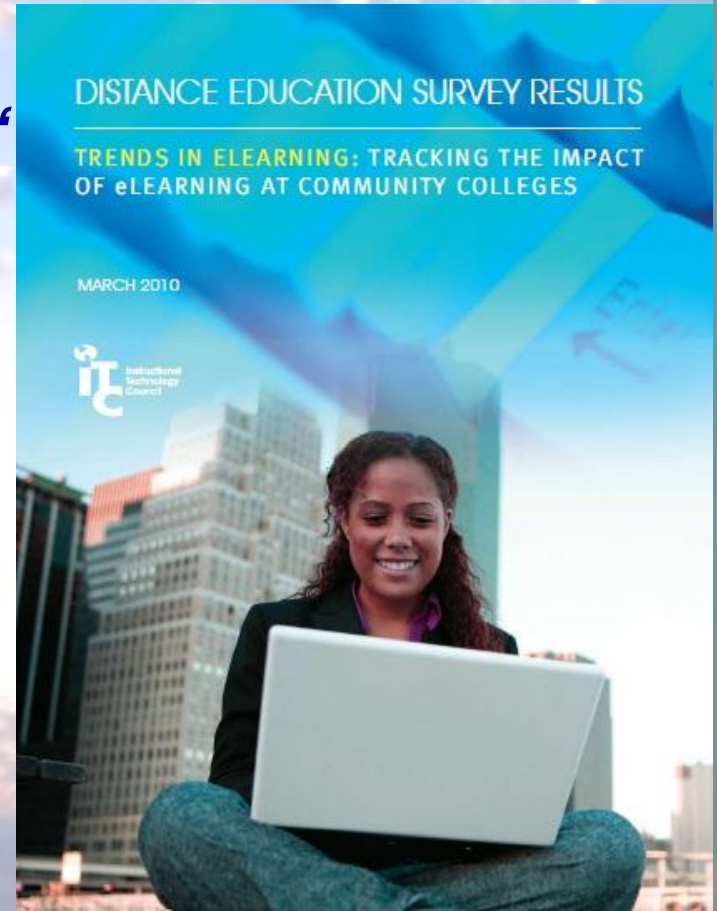


Source: Management Insight Technologies, September 2010

Utilizing the Cloud – Dealing with Challenges ...

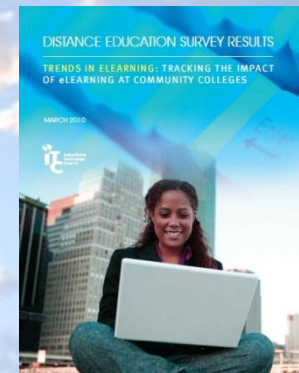
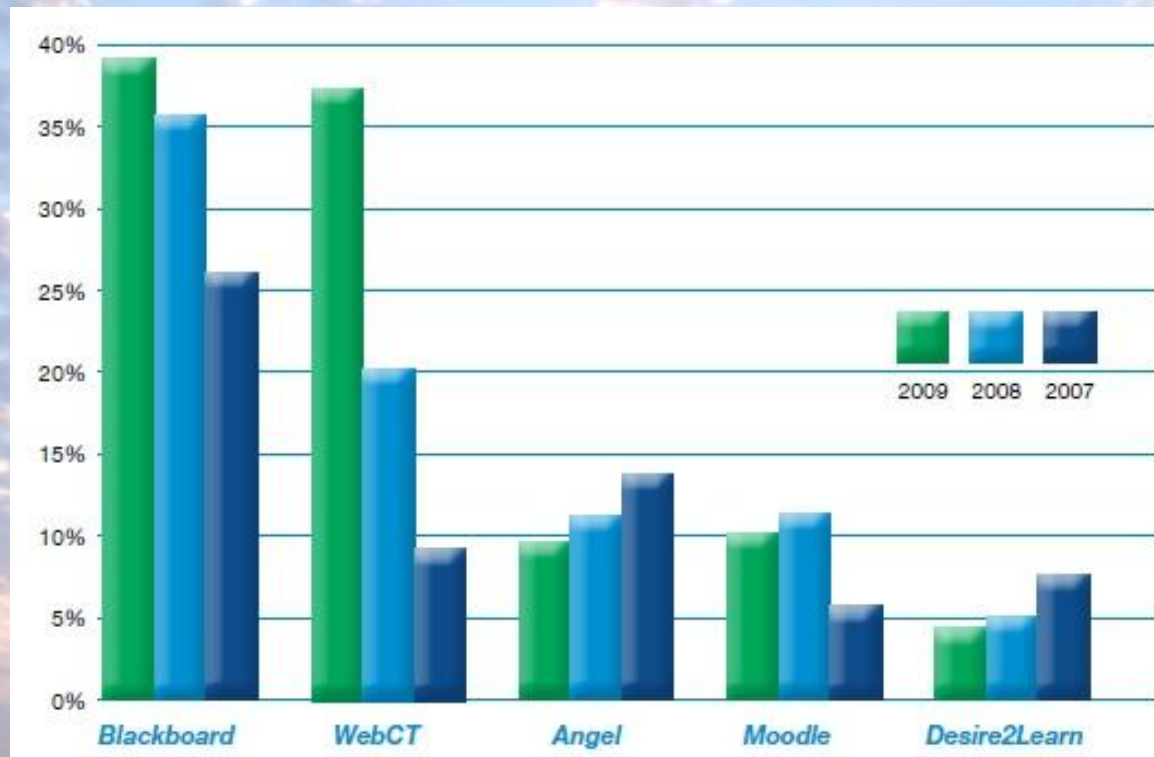
“A sea change in the way of computing will be performed...”

- *Increased enrolment with 22% in Distance education in 2009 compare vs. 2% in traditional model*
- *Asymmetric competition*
- *Increased speed:*
 - *of innovation and learning*
 - *to target audience*
 - *Of institutional model evolution*



Utilizing the Cloud – Dealing with Challenges ...

LMS Usage across US based HEI



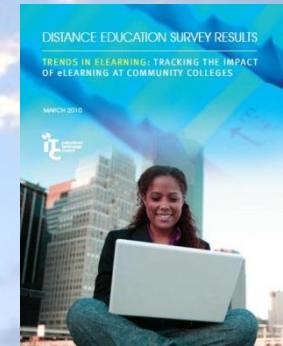
Trends in E-Learning, Integrated Technology Council, March 2010

Utilizing the Cloud – Dealing with Challenges ...

New Learning Environment Challenges

Range for responses 1 = greatest challenge 8 = least challenging

Challenge	Rank 2009	Rank 2008	Rank 2007	Rank 2006	Rank 2005	Rank 2004
Support staff needed for training and technical assistance	1	1	1	1	1	1
Adequate student services for distance education students	2	2	2	3	5	2
Adequate assessment of distance education classes (new question)	3					
Operating and equipment budgets	4	3	3	2	2	3
Adequate administrative authority	5	4	5	4	4	5
Faculty acceptance	6	5	4	5	3	4
Adequate space for training and technical assistance	7	6	6	6	7	7
Organizational acceptance	8	7	7	7	6	6
Compliance with HEOA requirements for distance education (new question)	9					
Student acceptance	10	8	8	8	8	8



Trends in E-Learning, Integrated Technology Council, March 2010

Utilizing the Cloud – Dealing with Challenges ...

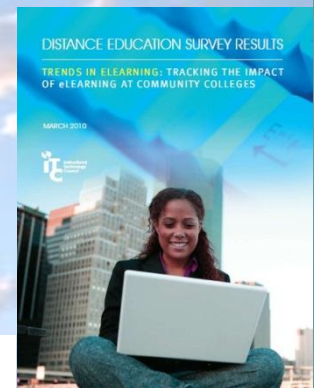
New Learning Environment Challenges ...

- *Workload Issues*
- *Training and Recruitment*
- *Compensation and acceptance*

Range for responses 1 = greatest challenge - 7 = least challenging

Challenge	Rank 2009	Rank 2008	Rank 2007	Rank 2006	Rank 2005	Rank 2004
Workload issues	1	1	1	1	1	1
Training	2	2	2	2	3	4
Compensation	5	3	3	3	5	2
Technical support	6	4	5	5	6	5
Buy-in to online instruction	4	5	4	4	4	3
Recruitment	3	6	6	6	2	6
Intellectual property/ownership issues	7	7	7	7	7	7

Trends in E-Learning, Integrated Technology Council, March 2010



Closing thoughts ...

- **IT in Organizational Context of HEI**
- **New Technology Trends and reflection on the core sets of activities**
- **Tailored Questions and Comments on Challenges and Opportunities**

Thank You!