

Astronomical Publishing: Yesterday, Today & Tomorrow

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Outline:

- I. History
- II. Why We Publish
- III. Publishing Models
- IV. All Things Change
- V. The Future of Scientific Publishing

JPH

Chair AAS Pub Board 1986-8

AIP Publishing Policy Committee 1988-95

Subcommittee on Journals
on Information Technology
on Translation Journals

PASP Editorial Board 1992-6

Scientific Editor ApJ 1998-2003

HBS Publishing Board 2005-7

Vice Provost for Research Policy 2005-6

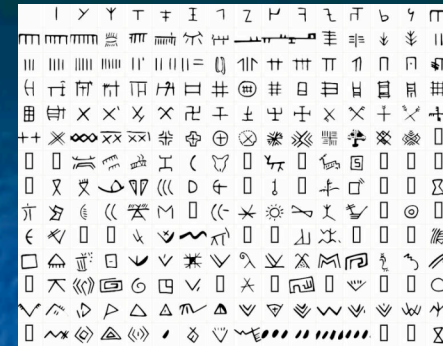
History

Earliest scripts ~ 6600-3500 BCE

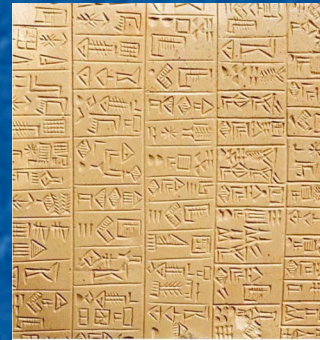
China Early Bronze Age

Europe

Egypt

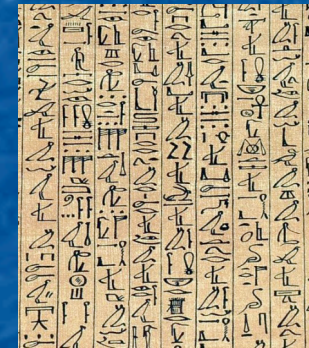


Vinca (Europe 6600 BCE)



Cuneiform

(Sumer 3500 BCE)



Hieroglyphs

(Egypt 3200 BCE)

Earliest "Records" ~ 2600 BCE

(Cuneiform + Hieroglyphs)

First Scientific “Periodicals”

Started in England & France ~ 1665

“Philosophical Transactions of the Royal Society”
England

“Journal des Sçavans” France

Followed by various Almanacs, especially

HM Nautical Almanac 1767 →

USNO Nautical Almanac 1852 →

There has been large growth in the number and diversity of scientific journals since the 18th century.

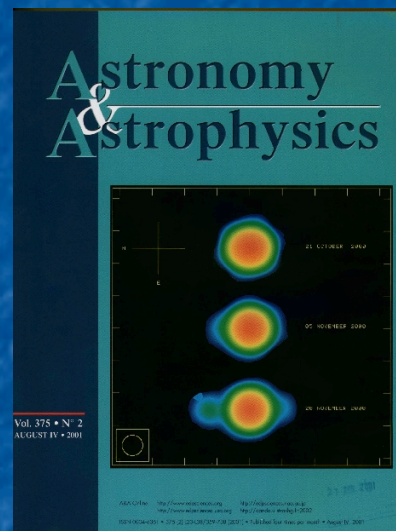
Currently there are over 24,000 *Refereed* Journals and probably over 150,000 total periodicals.

Astronomical Publications

Four Major "Print" Journals + many others



Hale
1895



Six Merge
1969



1827



Gould & Keeler
1849

April 13, 2010

Future Professional
Communication in Astronomy II



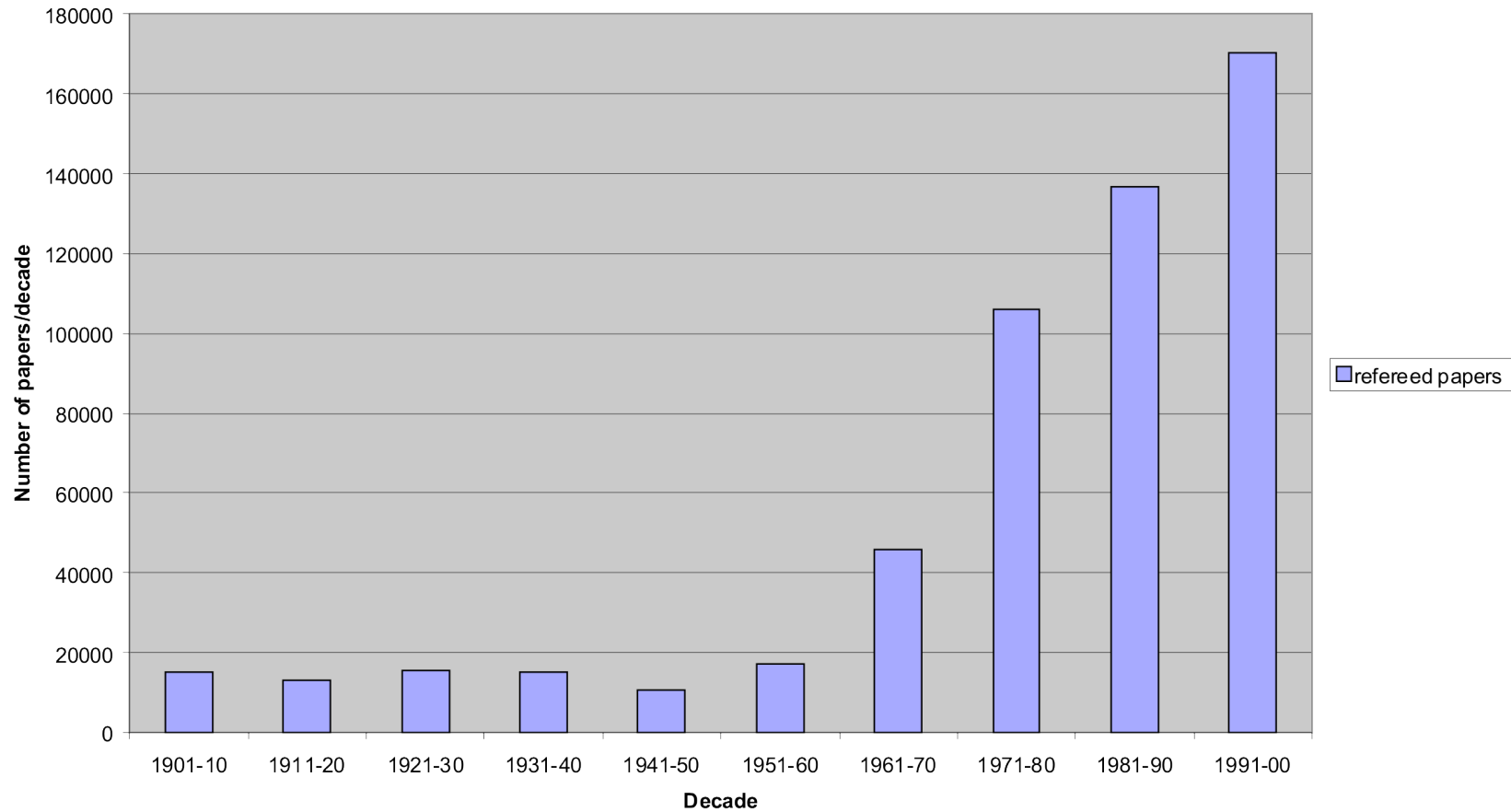
CfA
Wolbach Library
subscribes to
322 serials

April 13, 2010

Future Professional
Communication in Astronomy II

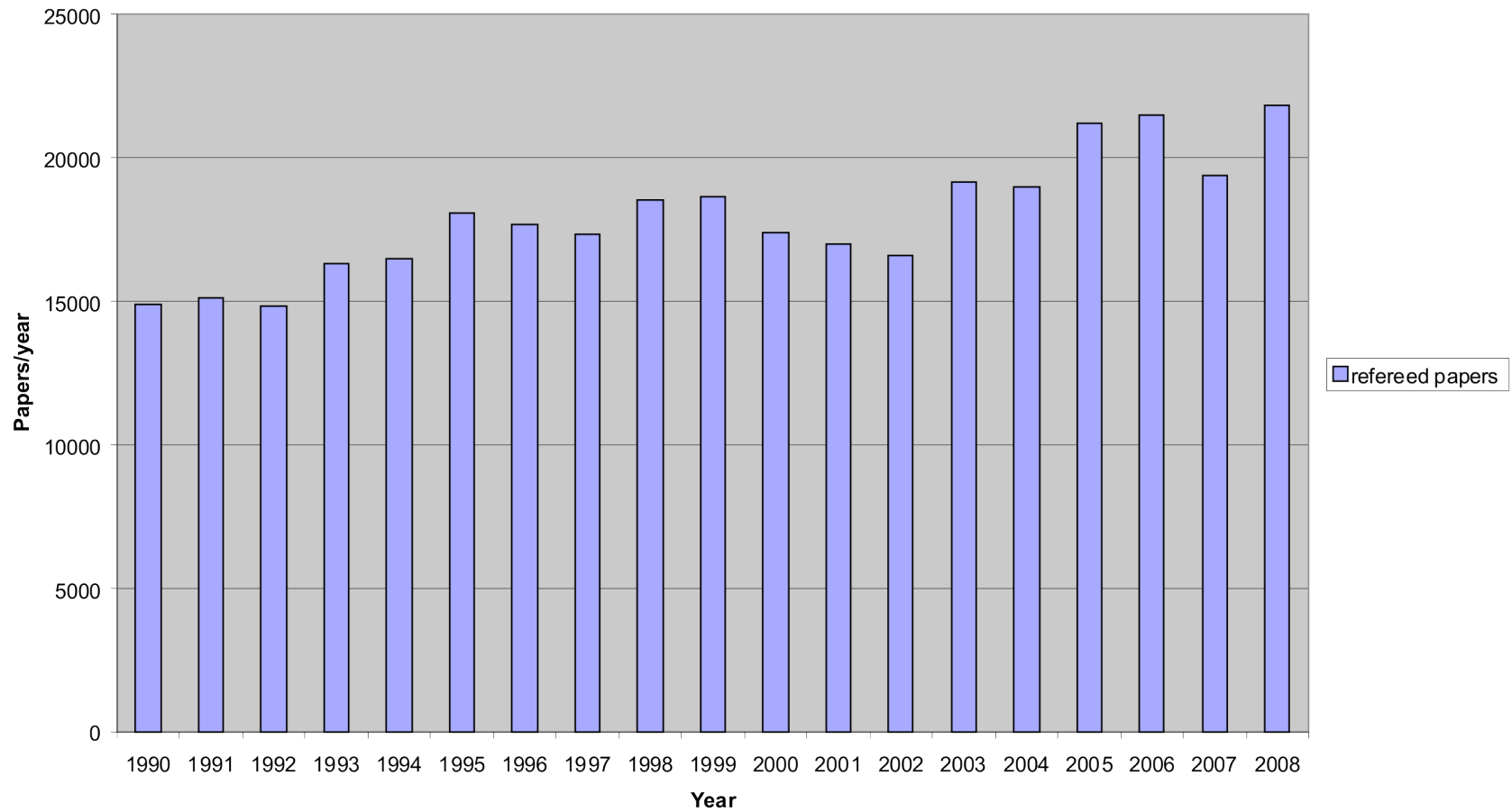
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Refereed papers in 20th C



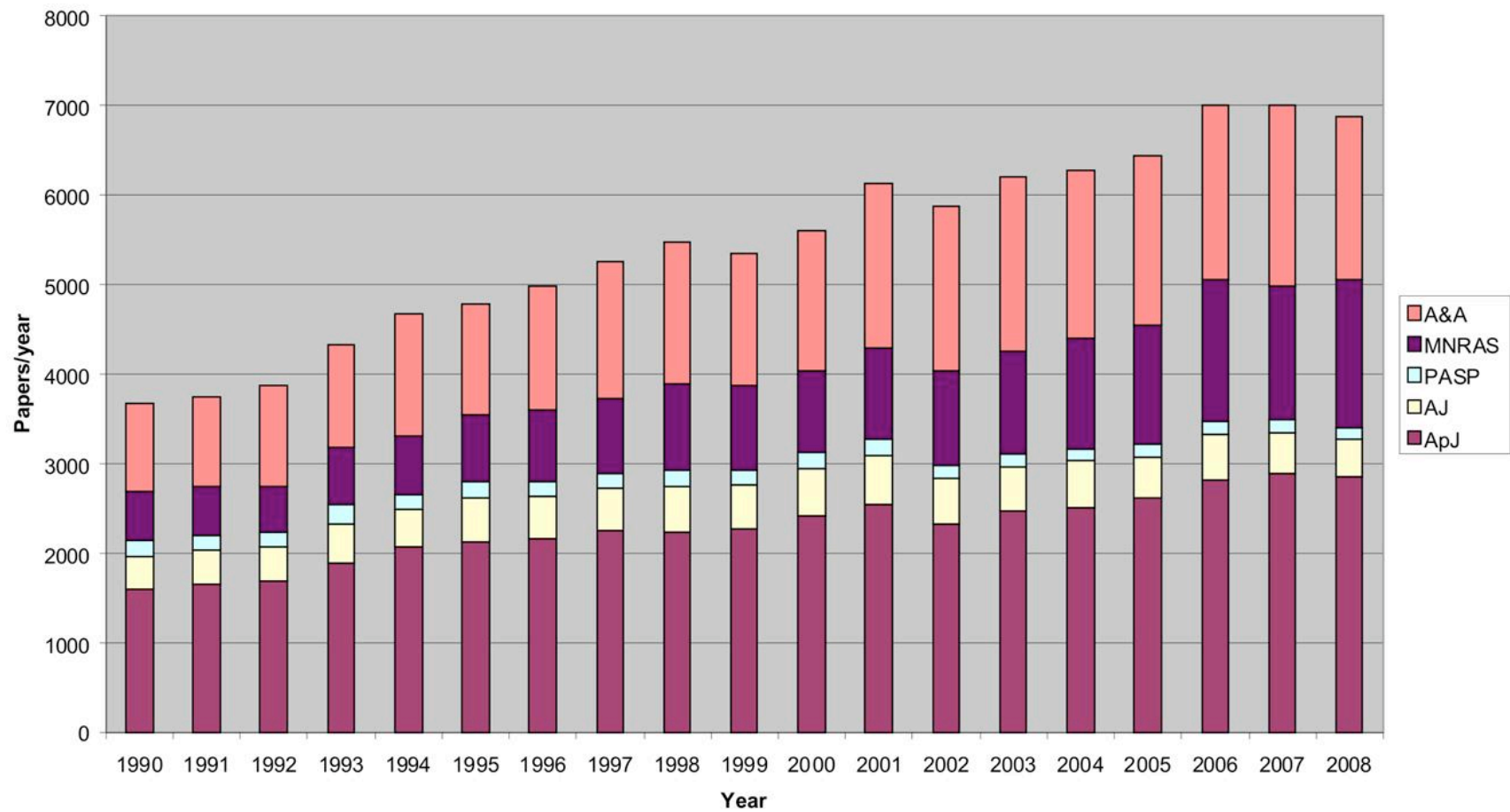
From J. Hearnshaw

Refereed papers 1990-2008



From J. Hearnshaw

Refereed papers in major journals 1990-2008



From J. Hearnshaw

Why Do We Publish?

Primary Reason is **Information Transfer**:

SI = To “increase and diffuse knowledge”
or

AAS = “The Society, through its publications, disseminates and archives the results of astronomical research. The Society also communicates and explains our understanding of the universe to the public.”

Why Else?

Career Advancement

Credit

Employment

Tenure (?)

Grants

Awards

Sometimes cash

~ **Field**
Dependent
+
Location
Dependent

Will this Change?

Primary reason **won't** --- for the foreseeable future we need to communicate results.

Secondary reasons might --- demographic shifts, career shifts:

1. "Tenure" changing
2. Criteria for employment changing
3. The way we do research is changing.

How do we Publish?

Publication Models

1. Primarily subscription charges (often for profit publishers but also others e.g. AIP)
2. User pays = primarily page/article charges
3. Benefactor or Single Payer (e.g. RAS)
4. Mixed Models (e.g. AAS)
5. Open Access models (often = benefactor)

Also in Traditional Models

Refereed Journals

What is the value added?

Is it worth the \$\$ and the time?

Personal experience --- I've never met a paper that couldn't be improved by the work of an impartial, knowledgeable referee...

Challenges --- finding good referees, maintaining standards, keeping t↓ and \$↓.

Ok, Why Open Access?

(forgive me, I'm from Harvard)

1. \$\$\$ The "Journals Crisis" – or the long term extreme increases in subscription costs (10-20%/year for institutional subs)
2. \$\$\$ Access to your (or your University's) own research products. Think Copyright Clearance Center.
3. Speed!
4. Altruism – access for the (academic) poor.

And, Things Change

AAS
Members

Growth 25%
faster
than US
Pop

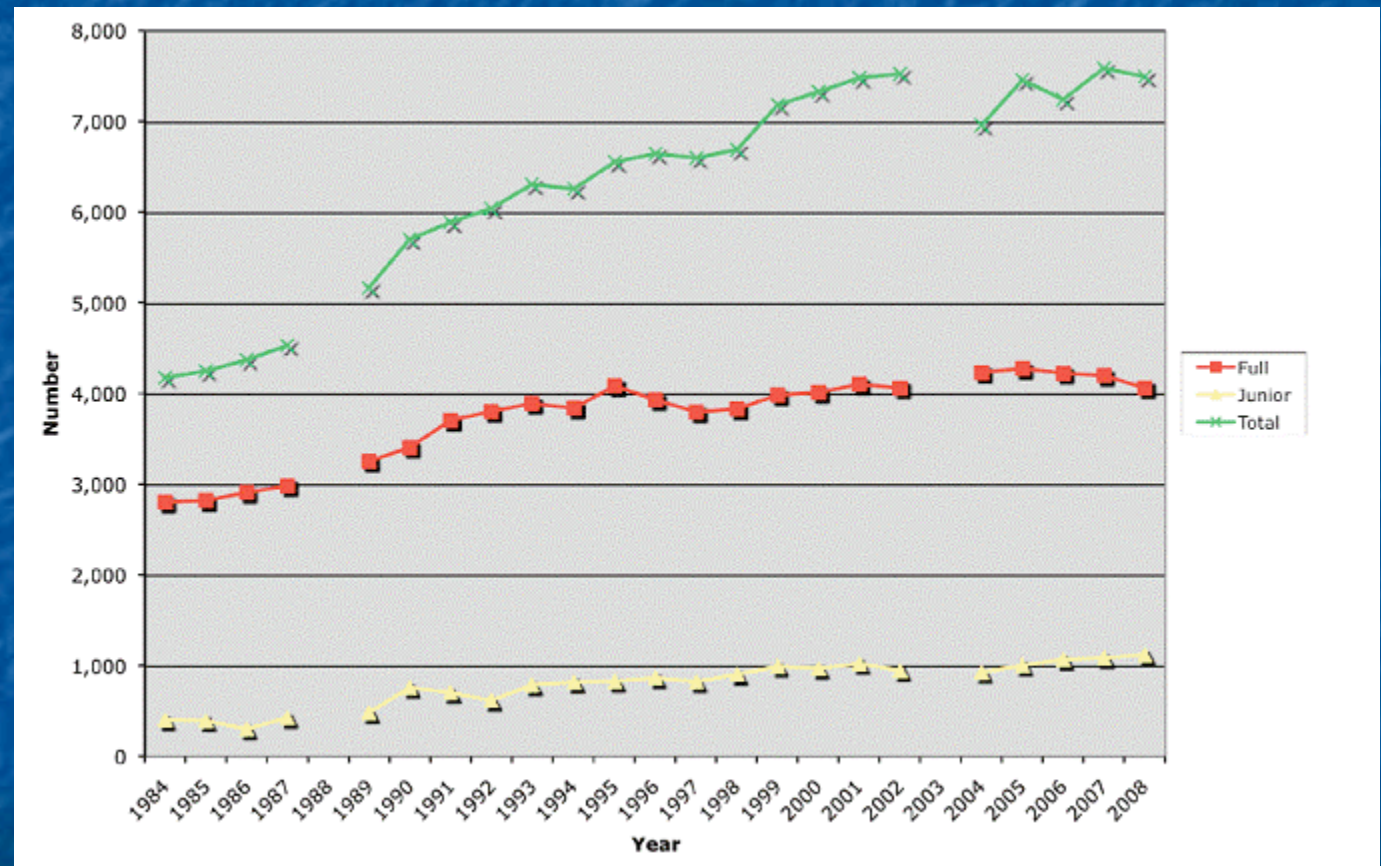
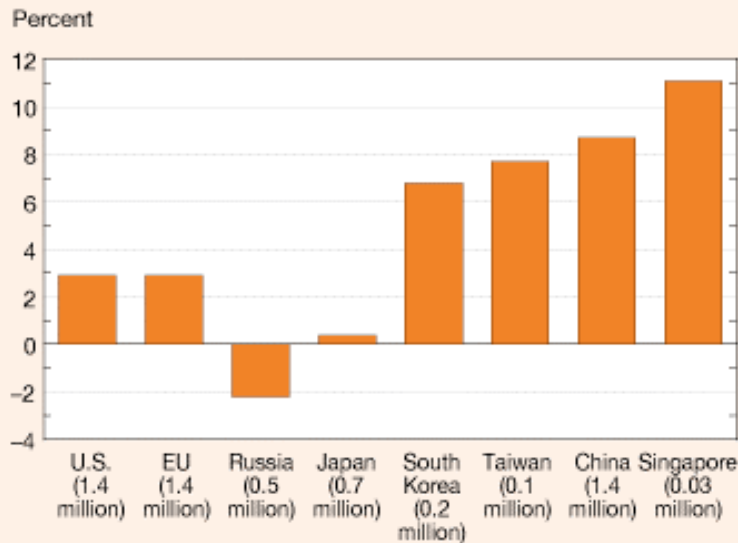


Figure O-11
Average annual growth in number of researchers in selected regions/countries/economies: 1995–2007



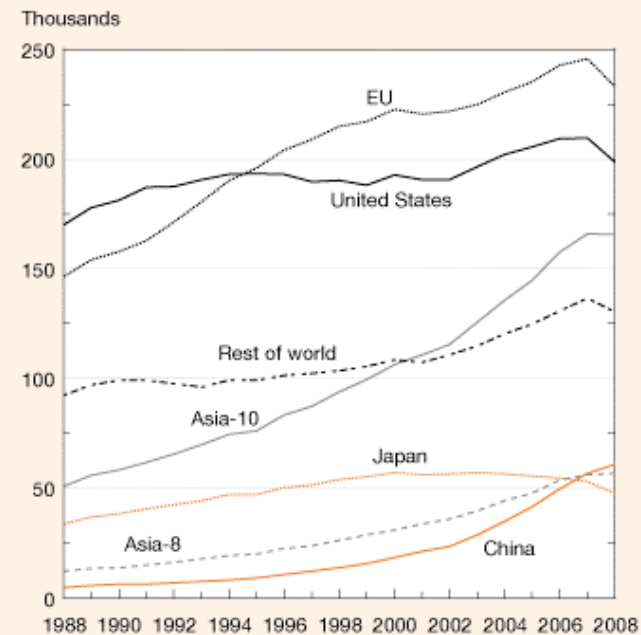
EU = European Union

NOTES: Researchers are full-time equivalents. Time span is 1996–2007 or closest available year. Number of researchers in 2007 or most recent year in parentheses. U.S. data for 2007 estimated based on 2004–06 growth rate. EU includes all 27 member states.

SOURCE: Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (2009/1 and previous years); and National Science Foundation, Division of Science Resources Statistics, special tabulations.

Science and Engineering Indicators 2010

Figure O-13
S&E journal articles produced by selected regions/countries: 1988–2008



EU = European Union

NOTES: See glossary for countries included in Asia-8 and Asia-10. EU includes all 27 member states. Articles classified by year of publication and assigned to region/country on basis of authors' institutional address(es). For articles with collaborating institutions from multiple countries/ economies, each country/economy receives fractional credit on basis of proportion of its participating institutions. Counts for 2008 are incomplete.

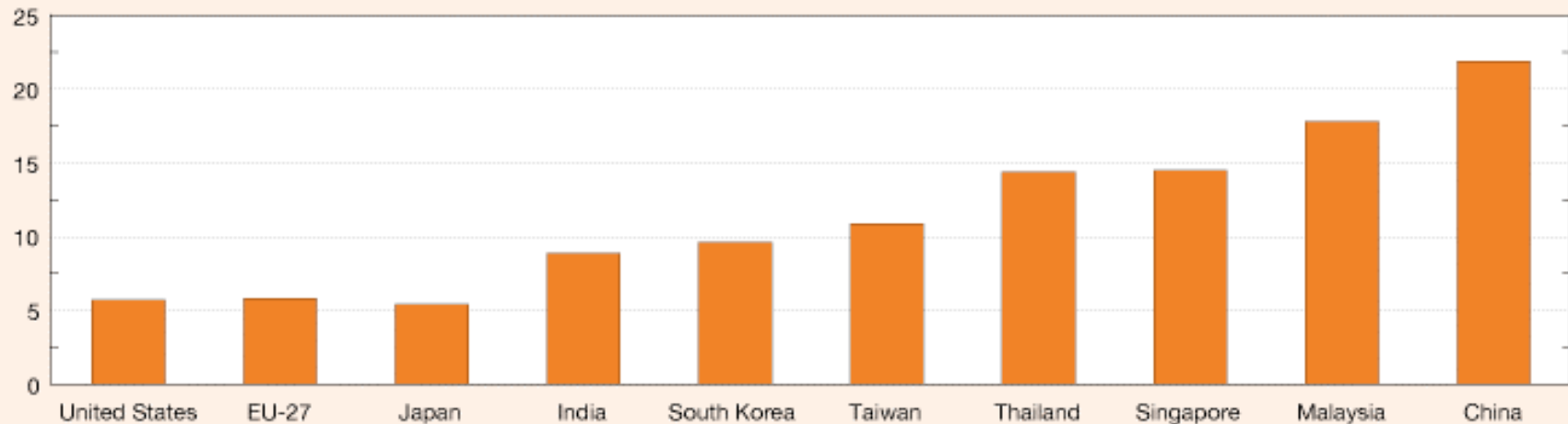
SOURCES: Thomson Reuters, Science Citation Index and Social Sciences Citation Index, http://thomsonreuters.com/products_services/science/; The Patent Board™; and National Science Foundation, Division of Science Resources Statistics, special tabulations.

Science and Engineering Indicators 2010

Asia

Figure O-4
**Average annual growth of R&D expenditures for United States, EU-27, and selected Asia-8 economies:
1996–2007**

Percent



EU = European Union

SOURCES: Organisation for Economic Co-operation and Development, *Main Science and Technology Indicators* (2009/1 and previous years); United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics, http://stats.uis.unesco.org/unesco/tableviewer/document.aspx?ReportId=143&1F_Language=eng; and National Science Foundation, Division of Science Resources Statistics, special tabulations.

Science and Engineering Indicators 2010

The Rise of Asia

Share of Total Global R&D Spending

	2008	2009	2010
Americas	39.9%	39.4%	39.2%
U.S.	35.4%	35.0%	34.8%
Asia	32.0%	33.5%	34.6%
Japan	13.2%	12.5%	12.3%
China	9.1%	11.1%	12.2%
India	2.4%	2.5%	2.9%
Europe	24.9%	24.0%	23.2%
Rest of World	3.2%	3.1%	3.0%

Source: Battelle, *R&D Magazine*

China's Share of World Publications

Technical Category	1999 to 2003		2004 to 2008		Growth
	Count	Share	Count	Share	
Materials Science	20,847	12.22%	48,210	20.83%	12%
Chemistry	44,573	9.29%	99,206	16.90%	15%
Physics	31,103	7.97%	66,153	14.16%	17%
Mathematics	7,321	7.37%	16,029	12.82%	16%
Engineering	19,343	6.42%	43,162	10.92%	14%
Computer Science	3,943	4.54%	16,009	10.66%	4%
Geoscience	5,322	4.95%	12,673	9.30%	11%
Pharmacology	2,259	3.11%	6,614	7.28%	7%
Environment	3,171	3.26%	9,032	6.85%	8%
Space Science	2,055	3.80%	3,514	5.89%	21%
Biology	6,697	2.66%	15,971	5.86%	10%
Animal Science	5,915	2.61%	14,646	5.42%	9%
Agricultural Science	1,082	1.48%	4,872	4.88%	1%
Microbiology	921	1.38%	3,863	4.74%	3%
Genetics	1,642	1.43%	6,210	4.49%	5%
Immunology	493	0.87%	2,114	3.51%	2%

Source: Thomson Reuters

India's Share of World Publications

Technical Category	1999 to 2003		2004 to 2008		Growth
	Count	Share	Count	Share	
Chemistry	21,206	4.42%	33,504	5.71%	10%
Agricultural Science	4,303	5.91%	5,634	5.65%	17%
Materials Science	6,960	4.08%	11,126	4.81%	9%
Pharmacology	2,034	2.80%	3,866	4.25%	3%
Plant & Animal Science	8,132	3.58%	10,190	3.77%	19%
Physics	11,700	3.00%	17,295	3.70%	14%
Engineering	8,101	2.69%	14,103	3.57%	5%
Geoscience	2,839	2.64%	4,266	3.13%	13%
Space Science	1,322	2.44%	1,665	2.79%	18%
Microbiology	1,078	1.62%	2,273	2.79%	2%

Source: Thomson Reuters

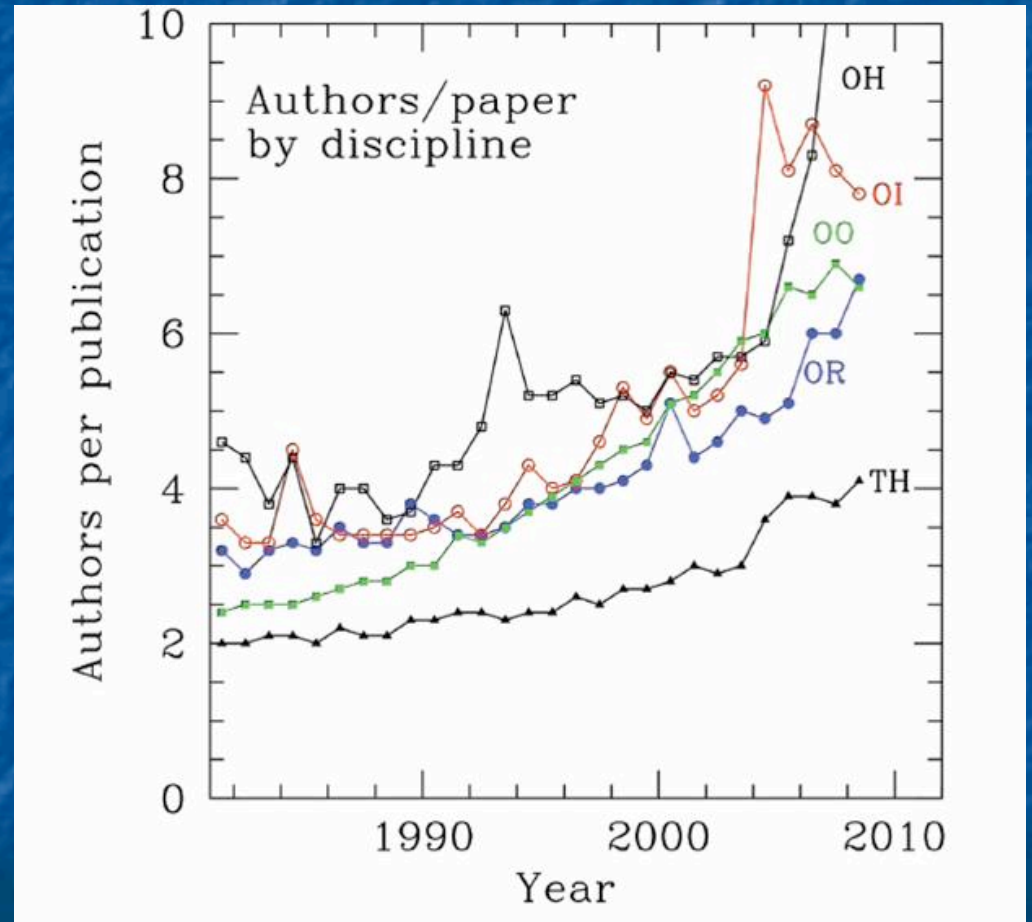
Global R&D Spending

	2008 GDP PPP, Billions U.S.\$	2008 R&D as % of GDP	2008 GERD PPP, Billions U.S.\$	2009 GERD PPP, Billions U.S.\$	2010 GERD PPP, Billions U.S.\$	2010 R&D as % of GDP
Americas	19,663	2.28%	448.1	438.8	452.8	2.32%
U.S.	14,260	2.79%	397.6	389.2	401.9	2.85%
Asia	18,800	1.91%	359.0	372.4	400.4	1.95%
Japan	4,329	3.41%	147.8	139.6	142.0	3.41%
China	7,973	1.28%	102.3	123.7	141.4	1.50%
India	3,297	0.80%	26.7	28.1	33.3	0.90%
Europe	16,487	1.69%	278.8	267.1	268.5	1.69%
Rest of World	2,958	1.21%	35.9	34.2	34.8	1.23%
Total	57,908	1.94%	1121.8	1112.5	1156.5	1.97%

PPP, Purchasing Power Parity
Source: Battelle, *R&D Magazine*

The Way We Do Science

Astronomy →
Physics,
especially
particle physics
(fortunately slowly)
Change is in the air.





Cornell University
Library



lanl.arXiv.org

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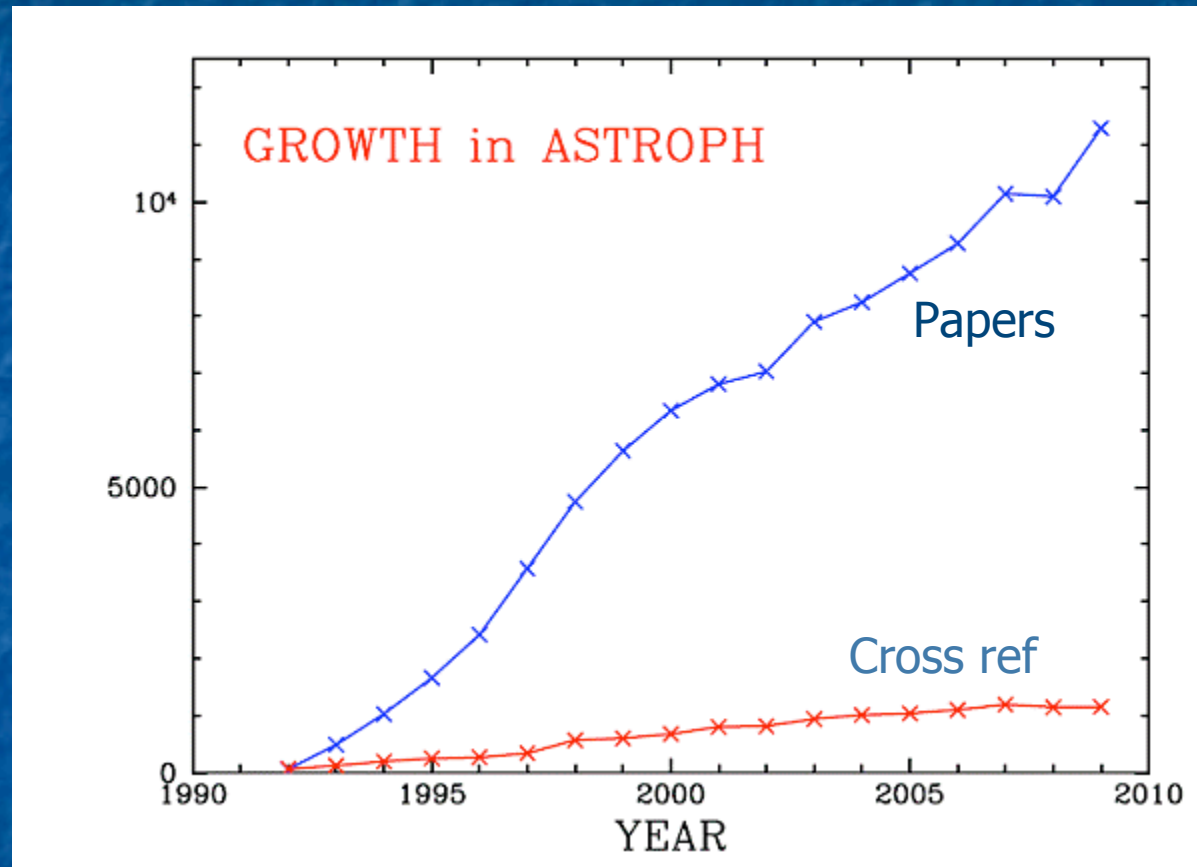
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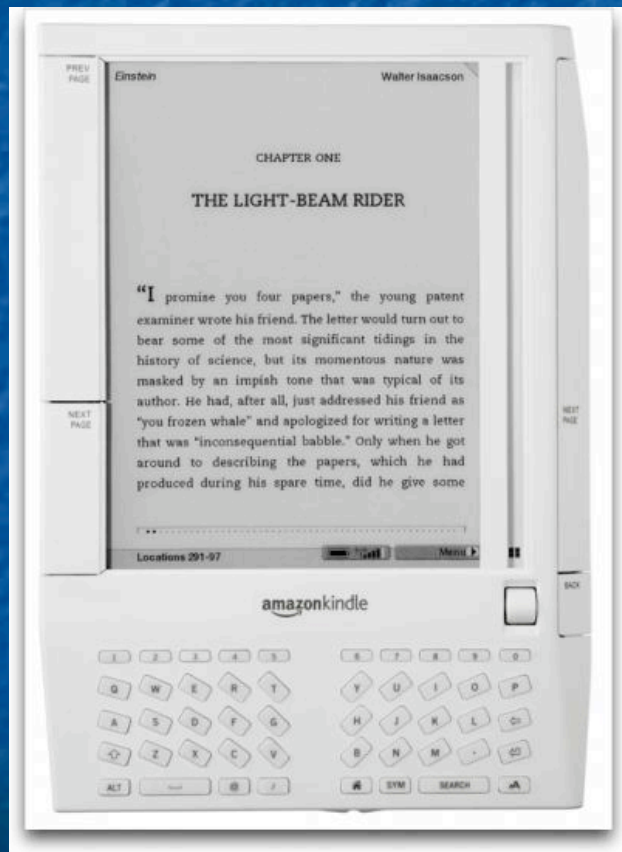
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ArXiv:

Growing
almost
linear with
time, total
astro-pubs
= 108,557
+ 12,631 X-r
April 12, 2010



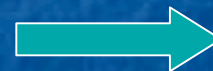
Even the Way We Access Information ---



Amazon Kindle



Apple iPad



And People

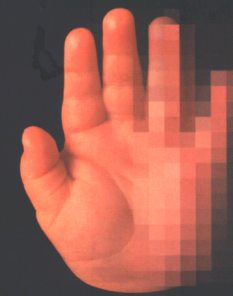
My Son

My Students

My Postdocs???

Digital Natives are
connected 24/7.

B O R N D I G I T A L



UNDERSTANDING
THE FIRST GENERATION
OF DIGITAL NATIVES

JOHN PALFREY AND URS GASSER

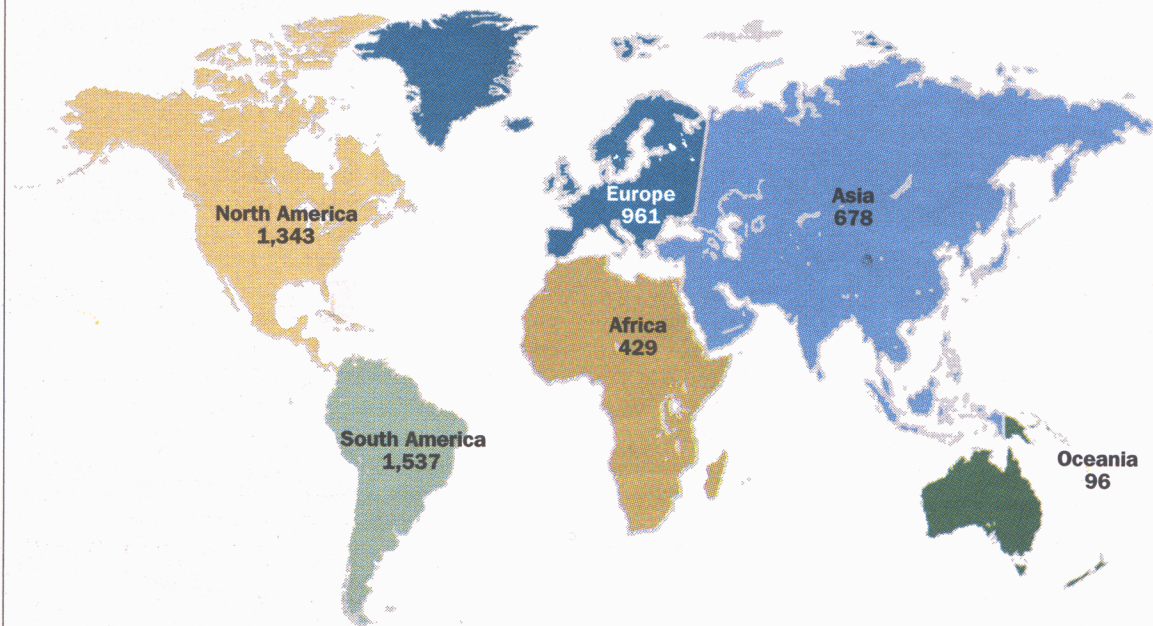
Open Access is Growing

> 4,700 Certified
Open Access
Journals
(Directory of Open
Access Journals,
Lund University
Libraries)

Chronicle
Feb 19, '10

A Single Group Helps Trigger an Online-Publishing Explosion

The Public Knowledge Project, a nonprofit group, estimates that the online-publishing software it offers free has given rise to more than 5,000 open-access academic journals around the world. Below is their geographic distribution, by continent, as of last month.



SOURCE: THE PUBLIC KNOWLEDGE PROJECT, BASED AT SIMON FRASER UNIVERSITY, STANFORD UNIVERSITY, AND THE UNIVERSITY OF BRITISH COLUMBIA

Open Access & the University

What is driving the University (and other) communities?

1. \$\$\$

The cost of buying reprints for classes

The cost/difficulty of simple “fair use” reproductions (e.g. this talk)

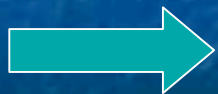
Library subscriptions to expensive (often for profit) journals

→ driven hard by the economic downturn

Open Access and the “Law”

Congress & The Administration & the Judiciary
are of two minds:

1. Intellectual Property rights (patents, copyright) → proprietary use of material to gain \$\$, competitive advantage
2. Free access to taxpayer paid information to gain \$\$, competitive advantage



We could get the worst of both worlds!

The Future

So where do we go from here?

Drivers are

New ways of communicating

Changes in the way we work

Changes in the world

Changes in resources available

and perhaps legal questions →

Future Solutions

- Remember 1. Why are we publishing?
2. Who are the users?

Disclaimer: I'm
married to an
economist

JPH's guesses

1. There will be an increasing move towards open access and very rapid publication.

“Tenure” based on only refereed publications will pass, especially as more astronomers are employed outside major research universities.

There are already major articles only on ArXiv.

Future Solutions

2. Publishers will need to move towards mixed business models with page or article charges.

This is not as crazy as you might think as we are moderately close to a single payer model now, either through page charges or through overhead supported library subscriptions.

3. Publishers should also identify “value added” components for their journals --- e.g. full text searches, completely linked cross references, curation of data included in publications.

Good scientific practice!

Future Solutions

- Individual authors are not capable of archiving either their papers or their data.
- Universities lack the expertise (and will) to do this for all fields

4. Publishers should continually work to identify new ways of providing services to their users. The Competitive Advantage.

The **Digital Natives** are coming, its only a matter of time! (and perhaps we should learn Chinese...)

The Astrophysical Tweet?

Tweets emerge as a serious business tool

By D.C. Denison
GLOBE STAFF

The burrito he purchased from Boloco was poorly wrapped, so Harvard senior Anthony Britt tweeted about it on Twitter, the popular social network.

The next day, the chief executive of Boloco, John Pepper, responded on Twitter: "can I help or make it up somehow?"

The conversation between CEO and customer continued over the next few days, in front of thousands of subscribers, demonstrating how seriously companies are taking Twitter, which is often derided as shallow and trivial.

"Companies are starting to realize that if their customers are on social networks like Twitter, they have to be there, too," said Mike Volpe, vice president of marketing at HubSpot Inc., a Cambridge company that sells social-networking software to small and medium-size businesses.

According to an analysis of Boston-area companies compiled for the Globe by HubSpot, using its popular "grader" software, the most active local corporate users of Twitter are advertising agencies, technology companies, and consumer brands.



Boloco Sunny, 60s and 70s throughout New England. Summer Burrito is the big mover today... and we'll throw in a mini.



Reebok We recommend the new ZigTechs - they are great for running/jogging, real comfortable. We're a little biased though



Vistaprint That's great to hear! Feel free to check out <http://www.vistaprint.com/twitter> for deep discounts on future orders.



Aceticket We've got a fun contest going on over at our Facebook page: enter for a chance to win a \$250 Ace Gift Card



Staples Your printer called. It's out of paper. Stock up with HammerMill Copy Plus Case Paper- now only \$29.99!

Boston Globe 4/12/10