Statistical Analysis of Internet Business Method Patents

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Objective of Study

- **To see how the Internet-patenting landscape looked in its early years.**

- **Determine whether Internet business method patents are different from patents generally by looking at objective quantitative measures in the patents themselves.**

- **Develop database for scholars interested in valuing Internet-related patents (claims, references, patent classifications).**

- **Provide information on innovation (regions, number of inventors, types of Internet business methods, ownership of Internet business methods).**

- **Provide factual detail for academic and policy debates about legitimacy Internet business method patents.**

Basics of the Study

- **Compare a set of general patents (1996-98) with a set of Internet-related patents (1990-1999).**

- **Compare subsets of Internet-related patents (business method patents, Internet software technique patents) with the set of general patents.**

- **Analyze the types of non-patent prior art references in Internet patents.**

Internet Patent Data Set

1423 Patents from PTO Classifications 705, 707, 709 for the time period 1/1/1990 through 12/31/1999

• Search terms on Lexis-Nexis Database of Full Text Patents: "Internet or World Wide Web" within three PTO classifications, 705 ("Data Processing: financial, business practice, management, or cost/price determination"), 707 ("Data processing: database and file management, data structures"), and 709 ("Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating"). Retrieved approximately 2800 patents.

• Removed patents not describing Internet-related applications. 1423 patents remained.

Variables Coded

1. Total Number of Claims
2. Total Number of References
   -- Total Number of Patent Prior Art References
   -- Total Number of Non-Patent Prior Art References
3. Number of Inventors
4. Number of Figures
5. Geographical Region of Origin
6. Number of 4 Digit IPC
7. Number of 9 Digit IPC
8. Type of Owner (large entity, small business, individual)
9. Type of Internet Patent (I-Bus Model, I-Bus Technique, I-Software Technique) – only on Internet Patent Set.
10. Type of Non-Patent Prior Art Reference – only on sample of Internet Patent Set.

Internet Patent Subtypes

- ***I-Business Model*: The described method would likely stand on its own as a business on the Internet, or a distinct line of business.** This is the broadest subtype. Note that we do not include patents in this category if the only likely business model is licensing out what we describe below as a business technique. The business method itself as described in the patent, rather than the licensing out of the method, must be *a business model or distinct line of business*.

- ***I-Business Technique***: Typically would not be a stand-alone business; rather it is a more narrow business practice/technique over the Internet.

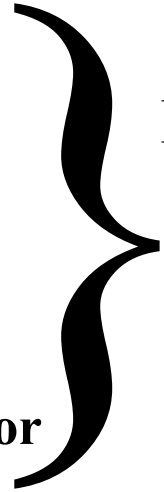
- ***I-Software Technique***: Patent focusing on more technical Internet functionality and not conditioned on a particular business application. These patents are often targeted at making the Internet more efficient and effective for conducting electronic commerce.

Internet Patent Subtypes

1. **I-Business Model Patent**
   - -- ex: Priceline.com's "Name your own price"
   - -- ex: NCR Corp's "Newspaper vending machine with online connection"

2. **I-Business Technique Patent**
   - -- ex: Amazon.com's "1-Click" purchase
   - -- ex: Lucent Technology's "System and method for scheduling and controlling advertising in a communications network.

3. **I-Software Technique Patent**
   - -- ex: Compaq Computer's "Method and apparatus for re-assigning network addresses to network servers by re-configuring a client host connected thereto."



I-Business Method Patents

Statistical Comparisons

1. Internet Patents vs. General Patents

2. Internet Business Method Patents (I-Business Model + I-Business Technique) vs. General Patents

3. Internet Patent Subtypes vs. General Patents
   -- I-Business Model Patents vs. General Patents
   -- I-Business Technique Patents vs. General Patents
   -- I-Software Technique Patents vs. General Patents

Null Hypothesis: There are no differences between Internet-related Patents and General Patents

Results: Total Claims

All Internet vs. General Patents

	All Internet	General
N	1423	1000
Mean	25.53	14.87
St. Dev.	20.94	11.47
Minimum	1	1
Maximum	375	120

$p < .05$

Internet Business Method vs. General Patents

	I- Business Method	General
N	1093	1000
Mean	26.26	14.87
St. Dev.	22.45	11.47
Minimum	1	1
Maximum	375	120

$p < .05$

Results: Total Claims
(Internet Patent Subtypes)

	I-Bus Model	I-Bus Technique	I-Software Technique	General
N	345	748	330	1000
Mean	27.24	25.80	23.14	14.87
St. Dev.	23.31	22.04	14.70	11.47
Minimum	1	1	1	1
Maximum	149	375	102	120

$p < .05$

Results: Total Claims

Conclusions:

- **Internet Patnets have more total claims than General Patents**

- **Internet Business Method Patents have more total claims than General Patents**

- **Each Internet Patent subtype has more total claims than General Patents**

Results: Prior Art References

	General Patents			vs.	All Internet Patents		
	Total Refs	Patent Refs	Non-Patent Refs		Total Refs	Patent Refs	Non-Patent Refs
Mean	15.16	12.79	2.37		23.04	14.23	8.80
St.Dev.	16.29	14.13	6.56		48.53	23.30	34.43
Min	0	0	0		0	0	0
Max	163	154	68		457	353	391

$p < .05$

Results: Prior Art References

	General Patents			vs.	Internet Business Method Patents		
	Total Refs	Patent Refs	Non-Patent Refs		Total Refs	Patent Refs	Non-Patent Refs
Mean	15.16	12.79	2.37		24.90	14.90	10.00
St.Dev.	16.29	14.13	6.56		53.15	23.76	38.56
Min	0	0	0		0	0	0
Max	163	154	68		457	314	391

$p < .05$

Results: Prior Art References
(General Patents vs. I-Business Model)

	General Patents			vs.	I-Bus Model Patents		
	Total Refs	Patent Refs	Non-Patent Refs		Total Refs	Patent Refs	Non-Patent Refs
Mean	**15.16**	**12.79**	**2.37**		**27.25**	**17.15**	**10.10**
St.Dev.	16.29	14.13	6.56		48.78	22.50	35.26
Min	0	0	0		0	0	0
Max	163	154	68		457	353	391

$p < .05$

Results: Prior Art References
(General Patents vs. I-Business Techniques)

	General Patents			vs.	I-Bus Technique Patents		
	Total Refs	Patent Refs	Non-Patent Refs		Total Refs	Patent Refs	Non-Patent Refs
Mean	15.16	12.79	2.37		23.82	13.86	9.96
St.Dev.	16.29	14.13	6.56		55.04	24.27	40.01
Min	0	0	0		0	0	0
Max	163	154	68		457	353	391

$p < .05$

Results: Prior Art References
(General Patents vs. I-Software Techniques)

	General Patents			vs.	I-Software Technique Patents		
	Total Refs	Patent Refs	Non-Patent Refs		Total Refs	Patent Refs	Non-Patent Refs
Mean	15.16	12.79	2.37		16.86	12.03	4.83
St.Dev.	16.29	14.13	6.56		27.48	21.59	13.03
Min	0	0	0		0	0	0
Max	163	154	68		457	353	391

$p < .05$

Results: Prior Art References

Conclusions: When compared to general patents, Internet business method patents have more total references, patent references, and non-patent references. Most of the difference is driven by non-patent references rather than by patent references. With respect to Internet patent subtypes, I-Business Models are the most different from general patents while I-Software techniques are most similar to general patents.

When we consider references per claim (Internet Bus Methods v. General),
• there are no significant differences in total references per claim (Internet B-Method .95; General 1.02);
•there are significant differences in patent references per claim (Internet B-Method .57; General .86); and
• there are significan differences in non-patent references per claim (Internet B-Method .38; General .16).

Non-Patent Prior Art Reference Categories

We examined the non-patent prior references in a 20% sample (N=285) of the total Internet Patent Set. The References were put in one of the following categories:

- **Academic and Trade Publications**
- **Company and Industry Publications**
- **University Publications**
- **Government Documents**
- **Software Programs**
- **Popular Press**
- **Published Patent Applications and patent office search reports**
- **Other (e.g., individual web pages, etc.)**

Mean Number of Non-Patent Prior Art References by Category and Patent Subtype

	Internet Patents (n = 285)	I-Bus Model (n = 70)	I-Bus Technique (n = 149)	I-Software Technique (n = 66)
Academic/Trade	4.44	5.07	4.89	2.74
Company/Indus.	1.9	1.5	1.36	0.48
University Pub.	0.17	0.07	0.16	0.29
Gov't Document	0.12	0.13	0.17	0
Software	0.46	0.40	0.52	0.38
Popular Press*	0.73	0.89	0.97	0.05
Pub. App/Search	0.08	0.06	0.12	0.02
Other	0.13	0.19	0.11	0.09

* = $p < .05$ (I-Bus Mod v. I-Bus Technique and I-Bus Technique v. I-Software Technique)

Mean Number of Non-Patent Prior Art References by Category and Owner Status

	Internet Patents (n = 285)	Individ. (n =33)	Large Entity (n = 204)	Small Business (n = 47)
Academic/Trade	4.44	2.12	3.99	8.11
Company/Indus.	1.90	0.33	0.91	3.06
University Pub.	0.09	0.20	0.16	0.09
Gov't Document	0.12	0.15	0.08	0.28
Software	0.46	0.30	0.32	1.17
Popular Press	0.73	0.12	0.75	1.11
Pub. App/Search	0.08	0.12	0.07	0.09
Other	0.13	0.30	0.08	0.21

No statistical differences among owner status groupings

Non-Patent Prior Art References by Category

Conclusions: Most non-patent prior art references are academic and trade or company and industry publications. The only difference among the Internet patent subtypes was that Internet business methods are much more likely to cite popular press as non-patent prior art than Internet software technique patents. There were no significant differences among different size entities in what non-patent prior art they used.

Patent Regions
(Statistically Significant Differences)

More Internet Business Method Patenting

	General Patents	Internet Bus Method Patents
Colorado	0.8%	1.9%
DC-MD-VA	1.8%	3.3%
Mass-NH	3.0%	5.7%
N.California	4.5%	24.6%
New Jersey	2.3%	5.5%
New York	5.6%	8.2%
N. Carolina	0.3%	1.2%
Oregon	0.5%	2.3%
Texas	3.5%	5.9%

Less Internet Business Method Patenting

	General Patents	Internet Bus Method Patents
Europe	17.3%	2.3%
Japan	21.4%	5.0%
Michigan	3.1%	0.7%
Ohio	2.1%	1.0%
Other Forgn.	5.9%	0.5%

Number of Inventors

	General Patents	Internet Business Method Patents	I-Bus Model Patents
N	1000	1093	345
Mean	2.26	2.43	2.54
St. Dev.	1.52	1.82	2.16
Min.	1	1	1
Max	11	14	14

Conclusion: While Internet Business Method Patents have more inventors than general patents, the difference is small, and that difference is driven primarily by Internet business model patents.

Days in PTO

	General Patents	Internet Business Method Patents
N	**1000**	**1093**
Mean	**1011.9**	**885.56**
St. Dev.	**662.5**	**244.35**
Min.	**243**	**154**
Max	**6626**	**2198**

Could not conclude that there is a statistical difference*

Owner Status

	# of Internet Business Method Patents	# of General Patents	Pr > Chi Square
Individual	179 (16.38%)	175 (17.5%)	0.494
Large Entity	690 (63.13%)	707 (70.7%)	0.0002
Small Business	212 (19.4%)	107 (10.7%)	< 0.001
Non-profit	12 (1.1%)	11 (1.1%)	n.a.
Total	1093 (100%)	1000 (100%)	n.a

Internet Business Method Patents have fewer large entity owners compared to General Patents. Internet Business Method Patents have more small business owners compared to the General patents.

4 Digit IPCs

Number of 4 Digit IPCs in Patent	General Patents	Internet Business Method Patents
1	817 (81.7%)	1030 (94.2%)
> 1	183 (18.3%)	63 (5.8%)
Total	1000 (100%)	1093 (100%)

Compared to General patents, Internet business method patents have fewer 4 Digit IPCs based on the two-sample test for proportions.

9 Digit IPCs

Number of 9 Digit IPCs in Patent	General Patents	Internet Business Method Patents
1	631 (63.1%)	900 (82.3%)
> 1	369 (36.9%)	193 (17.7%)
Total	1000 (100%)	1093 (100%)

Compared to General patents, Internet business method patents have fewer 9 Digit IPCs based on the two-sample test for proportions.

Conclusions

Compared to General Set of Patents, Internet Business Method Patents:

- **Have more total claims**
- **Have more total references and non-patent prior art references**
  - **The non-patent prior art references are mostly from academic and trade publications. Internet Business Methods have more popular press references than I-Software Techniques**
- **Come from different regions (esp. N. California)**
- **Have slightly more inventors (esp. I-Bus. Models)**
- **Have fewer large entity owners, and more small business owners**
- **Fall into fewer 4 Digit and 9 Digit IPCs**

Extra Slides

Prior Art References Per Claim

	General	All Internet	I-Business Methods	I-Bus Models	I-Bus Tech	I-Software Tech
Total Refs/ Claim	1.02	.90	.95	1.00	.92	.73
Patent Refs/ Claim	.86	.56	.57	.63	.54	.21
NonPat Refs/ Claim	.16	.34	.38	.37	.39	.21