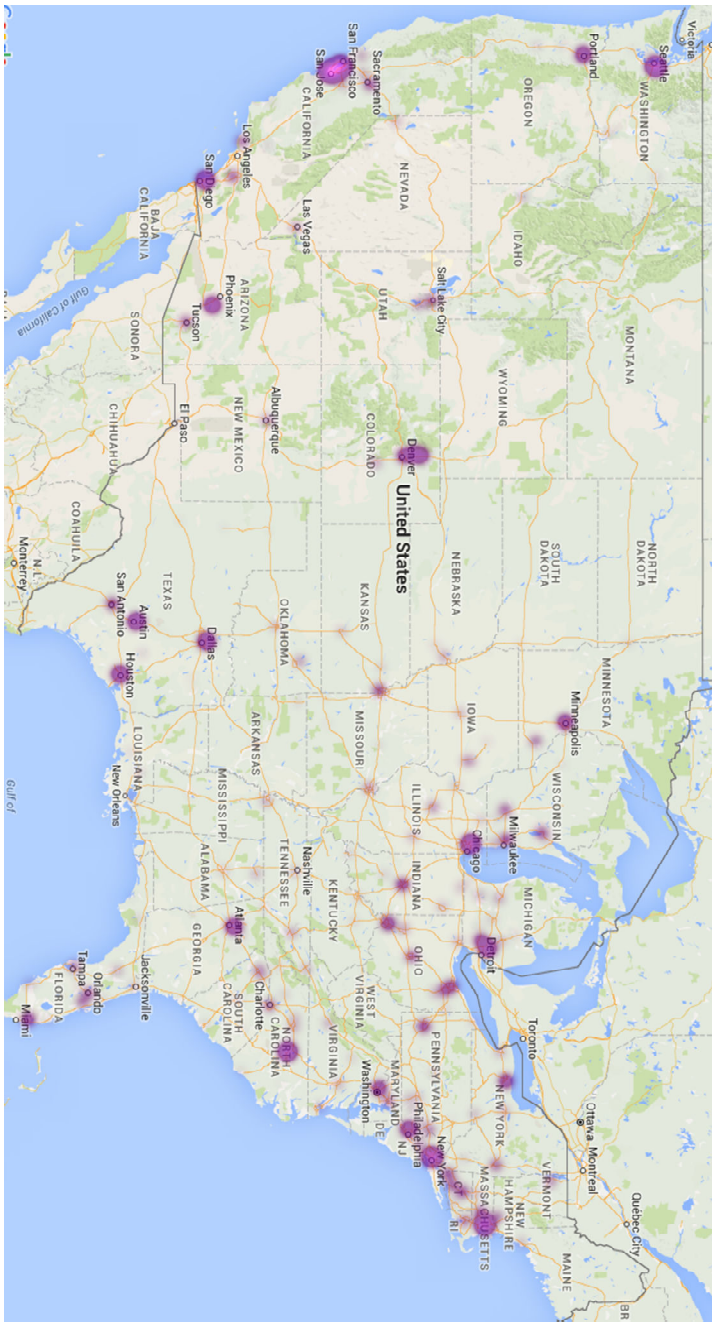
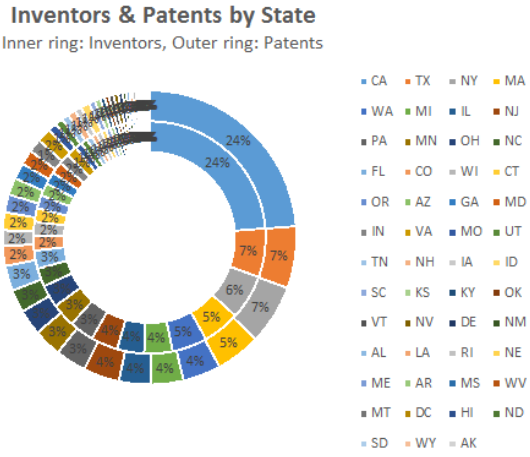
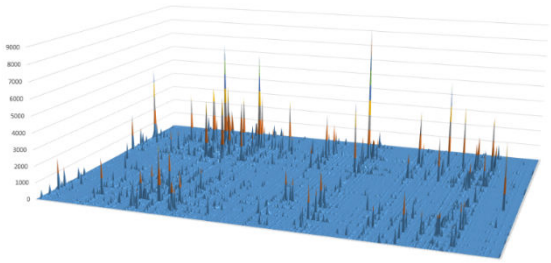
The Inventiveness Index

2005-2014







February 2016
Author: Joe Chiarella

www.InventivenessIndex.com

Acknowledgements:

This study / analysis / report would not have been possible without:

- **Adam Rehm**, Esq. – Polsinelli, PC in Dallas, TX (For the initial questions he asked relative to patent analytics. Were it not for these questions, I would never have developed the tools, methodologies, or understanding of the datasets which enabled this work)
    - Learn about Adam here: https://www.linkedin.com/in/adamrehm
- **Malcolm O'Callahan** – Software Engineer in Harrisburg, PA (for his help with the heat mapping application and assistance with a SQL Server issue)
    - Learn about Malcolm here: https://www.linkedin.com/in/malcolmo

CONTENTS

Make sure you don't miss the companion documents found at www.InventivenessIndex.com:

Document	Brief Description
InventivenessIndex_ListAddendum	This Addendum includes all 250 metros for each Index.
InventivenessIndex_CommunityProfiles	For each of the 250 metro regions analyzed, read the key inventiveness metrics.
InventivenessIndex_Class_x_Metros	See this report to find all the metros who have inventors with patents in each of the 400+ patent art classes.

GENESIS

Welcome to the Inventiveness Index.

The United States of America has a history of being one of the most creatively utilitarian nations on the planet. Our ecosystem which supports this culture of innovation and invention is one of the most refined, mature and sophisticated in the world. It is also one of the most productive.

If we can consider innovation and invention related, and measure them through our patent system, then we can empirically measure the inventiveness of our nation and of specific regions within it.

Hi, I'm Joe Chiarella. I have been involved in numerous high-tech startups and I've also been involved in several civic efforts to support and grow tech ecosystems. In the course of my professional life, I have given birth to innovations. Some of those I chose to protect as inventions through the Patent and Trademark Office (PTO) in the US. On some occasions, investors and others have asked me to review the patent positions of various companies. Having also been part of assorted civic economic development exercises designed to foster entrepreneurship in general, and tech startups in particular, I've given a lot of thought to the genesis process for companies. I find they are often rooted in invention. These exercises drove me to ask some questions about invention in my own region, our nation in general and the various metropolitan areas within it. In fact, I had already attempted to measure some level of inventiveness in my own community as part of one of those prior efforts.

During this time I was talking with one of the patent attorneys I am fortunate to know and work with (Adam C. Rehm with Polsinelli, PC in Dallas) about a new genre of Software as a Service called Patent Analytics. Once Adam and I began talking about Patent Analytics, and once I began downloading and processing actual patent records from the PTO, I realized that with a little work, a good database and some time, I could illuminate the state of invention in our great nation. I wondered what surprises this data analysis might reveal and how we could use those results to foster more entrepreneurship.

This report is the culmination of months of effort, involving thousands of queries on a database of 2.5 million patents, and assorted Census and IRS datasets – collectively embodied in over 120 million records. In truth, there are far more answers and details from that effort than this report contains. And many new questions too.

EXECUTIVE SUMMARY

The Inventiveness Index ranks the inventiveness of the top 250 metropolitan areas of the US based on nine equally weighted indices. Each community is ranked by individual index and an overall, or composite, ranking is based on a simple sum of the individual indices.

There are two indices focused on inventors (Inventors and Inventor Density), two focused on companies (Entities and IP Company Density), three focused on patents and patent (art) classes (Patents, Class Diversity and Tops in Class), one focused on 'inventor retention' (Home Team) and one focused on how that region is changing over time (Up and Coming).

Index	Description
Inventors	The number of total inventors in that metro region (total unique over the ten year period).
Patents	The number of total patents in that metro region, from inventors in that metro region.
Inventor Density	The number of inventors per capita (shown as inventors per thousand population) in that metro region. This index joins patent data with census data for 2010 to 2014 inclusive.
Entities	Total number of organizations (companies, academia, non-profits and government entities) in the metro region - based on assignee/owners.
IP Company Density	The percentage of all companies in that metro region that hold patents (Intellectual Property). This index joins patent data with IRS data (for the total number of companies in that metro region filing tax returns).
Class Diversity	Patents are assigned to patent (art) classes. There are several classification systems. Using the traditional US measure, there are about 470 art classes. This index measures the number of different art classes for the patents held by the inventors in that metro region. It measures how "homogenous" or "heterogeneous" the inventors are in that metro region.
Tops in Class	In each of the 470+/- patent art classes, one or more metro regions have inventors with patents in that art class. In each art class, there is one metro region that has more inventors/patents in that art class than any other metro region. This index counts the number of art classes in each metro region, for which that region is ranked first in that class. It is a measure of 'concentrated excellence'.
Home Team	Most inventors do not live in the same metro region as the headquarters of the company to which their patents are assigned as owner. This index ranks the 250 metro regions based on the percentage of inventors/patents in the same region as the owner to which their patents are assigned.
Up and Coming	Metro regions are fluid, not static. Some regions are increasing their numbers of inventors, patents, patent holding entities, etc. – more than others. This index is a composite of three other measures that look at the change in patent class diversity over time, the change in inventor density over time and the change in new company creation over time.

The top 25 ranked metro regions are found below on page 16. In addition to a simple ranking of these metro regions, there are other findings and analysis that illuminate the state of invention in the USA over the past ten years. Data is sliced by inventor, community, patent art class, time and other factors.

The Inventiveness Index is an aid to a wide range of stakeholders who have an interest in enhancing economic development, jobs, public policy and more. Use it to promote your region. Use it to locate talent in a particular area of patented technology. Use it to guide public policy at the local, state or federal level. Or use it for business development. Of course, the Index is just the tip of the iceberg. If you have a particular question not answered by the public reports, go to the InventivenessIndex.com site and send your question to the study author who can mine the database for the answer.

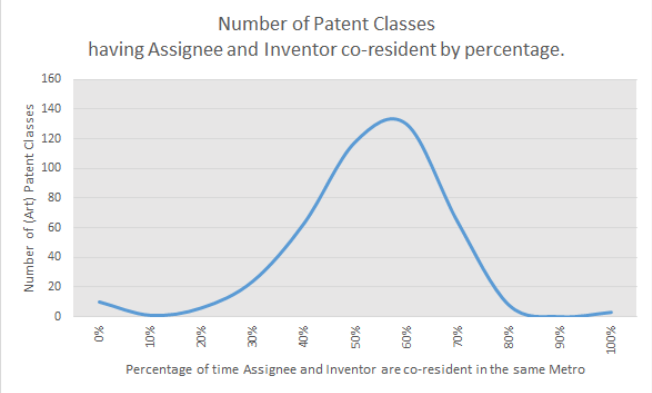
INTRODUCTION

The Inventiveness Index examines the corpus of ten years of issued US patents from Jan 1, 2005 through Dec 31, 2014. It ranks the top 250 metropolitan areas[1] of the US on a variety of factors – but is centered on the inventors and where they live – versus past studies that focus on the patent owner (typically the inventor's employer). This Index focuses only on Utility (89.9% of all) patents, not Design (9.4%), Plant (0.4%) or Reissue (0.3%) patents.

Why focus on the inventor location? Most patents (87.6%) are Assigned to an owner-entity (i.e. – not the Inventor). When there is an Assignee, the Assignee is frequently not in the same metropolitan area as the Inventor. Here's a quick sampler:

Patent Art Class	Assignee Locations	Inventor Locations	Shared Assignee-Inventor Locations	Shared Percentage
192 clutches and power-stop control [192]	57	94	49	52.1%
Abrading [451]	102	165	99	60.0%
Abrasive tool making process, material, or composition [51]	25	56	24	42.9%
Acoustics [181]	95	144	88	61.1%
Active solid-state devices (e.g., transistors, solid-state diodes) [257]	112	160	104	65.0%
Adhesive bonding and miscellaneous chemical manufacture [156]	145	208	143	68.8%
Advancing material of indeterminate length [226]	20	27	13	48.1%
Aeronautics and astronautics [244]	110	168	106	63.1%
Agitating [366]	106	157	101	64.3%
Alloys or metallic compositions [420]	25	53	20	37.7%

As the table shows, in the case of Acoustics related patents, there are 95 metro locations where an Assignee owns an Acoustic-related patent. There are 144 metro locations where Inventors reside who have been awarded Acoustic-related patents. Of the 94 Assignee locations and 144 Inventor locations, only 88 (61.1%) of the locations have both inventors and assignees of Acoustic patents in the same location. [2]



One way to read this chart is to see that of the 427 different patent classes (art classes), about 120 of them have the Inventor and Assignee co-resident about 50% of the time. The most frequent case (130 patent classes) have the Inventor and Assignee co-resident in about 60% of the metros where the Inventors reside. In fact, for 162 (38%) of the 427 art classes, the co-residency is less than half.

So, to find concentrations of talent, it makes far more sense to focus on where the Inventor lives, rather than the headquarter location of the Assignee.

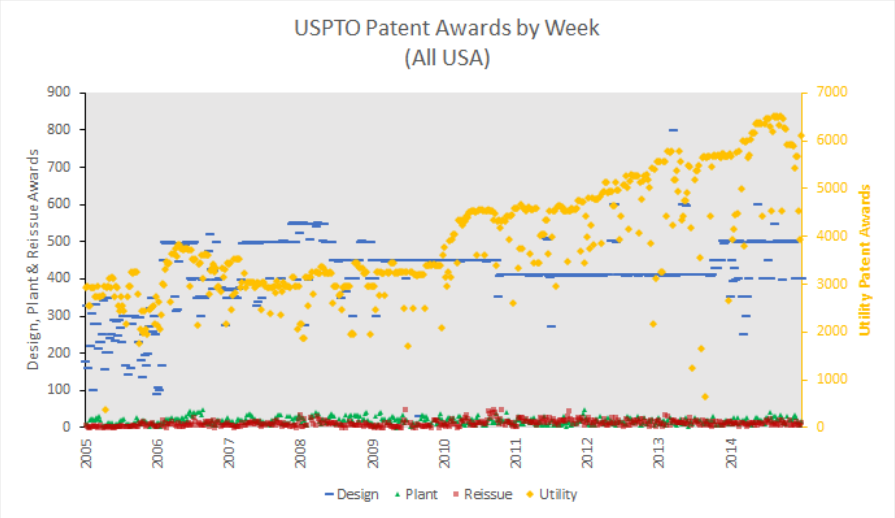
By focusing on inventor location, we can identify communities of invention and centers of competency.

[1] The US Bureau of Labor Statistics and the Census Bureau track 33,077 communities via 953 broader statistical areas (called CBSAs or Core-Based Statistical Areas). This study focused on the largest 250 CBSAs comprising 13,516 smaller communities. Collectively, these 250 of the 953 CBSAs (26.2% of the CBSAs and 40.9% of all communities) represent 266 million of the 315 million people (84.4%) living in the USA in 2013. This study therefore includes all but the most rural parts of the nation.

[2] The full table is available in the companion "List Addendum" document.

A SAMPLE OF FINDINGS

It is no surprise that places like Silicon Valley, Boston, New York, Austin, Seattle, San Diego, etc. are hot spots of inventiveness. As the saying goes, where there is smoke, there is fire. But this report isn't about what is obvious, it's about understanding more of the totality of inventiveness in the nation. It's about understanding where the concentrations of talent are for specific industries. It's less about broad brushstrokes and more about specifics. And there are a LOT of specifics.



It is important to speak to some broader questions that the data does NOT answer – because the data isn't there to do so, or it would take a much more human intensive manual effort to answer.

For example, one of the things I spent a great deal of time attempting, but ultimately failing, to uncover – is the relationship between inventors and new company startups. This was one of the primary goals of this research; to understand the level which inventors/patents contributes to the greater economic growth of each of the many metro regions. Sadly, there does not appear to be any reliable publicly available data that is 'linkable' to this patent data.

There are 'inferences' that can be made. For example, the "Trending New Company Creation" Index infers new company creation rates based on first appearances of a patent assignee name in a given metro region. However, it cannot definitively know that these are "startups" or existing companies who just obtained their first patent(s).

A reliable public resource that lists new company formation dates would greatly aid in the process of drawing the correlation between inventors/patents and newly formed companies. If there is another way to do this, I certainly invite others to a collaboration.

New companies also typically mean new jobs, but this too was a correlated data set that I could not seem to secure. The goal, of course, also being to connect new job growth to awarded patents and their inventors.

In short, we all assume that "invention" drives some portion of the economy – but what portion(s) and how much? This study was unable to clearly draw these relationships.

Another unanswered question has to do with the relationship between inventors in a region and institutions of higher education. That is to say, is there a cause – effect relationship between certain colleges/universities and the greater inventiveness in their region? If so, which is the cause and which is the effect? Or not at all? As we all know, correlation is not causality.

To make this concrete – the study illuminated the most prolific higher education institutions in terms of patents held. See the "bonus rankings" section for the "Top 100" list. Is it a surprise that four California institutions (Univ Of Ca, Stanford, USC and CalTech) have over 20% of all the patents in the top 100 higher education institutions – and that California as a whole claims 21% of all the inventors and 23% of all the patents in the nation? And that the primary locations of these higher education institutions are in relative close proximity to some of the most inventive metro regions?

Still, these are very high level "curiosities" (I resist calling them correlations). A deeper evaluation is

warranted to draw out the relationship between higher education and inventiveness in any given region. However, should that relationship be quantified, then perhaps there are ways that communities can better leverage their existing higher education institutions' patents – or – ways to tighten the relationship between enterprises and those institutions so that more patents can be commercialized.

With those open questions out of the way, what relationships or conclusions were drawn?

First, while there is much talk of Silicon Valley being the center of innovation (inventiveness) – there is far more happening elsewhere than many might think. Silicon Valley (SanJose metro #41940) can lay claim to 69684 inventors and, by way of inventors per capita, they can certainly claim to be the highest at 1.2 per hundred people in 2014. However, during the ten year period there were 844,502 inventors across the target 250 metro regions. This means that 92% of all inventors live somewhere other than Silicon Valley. The USA is broad and rich with inventiveness in plenty of places outside of northern California.

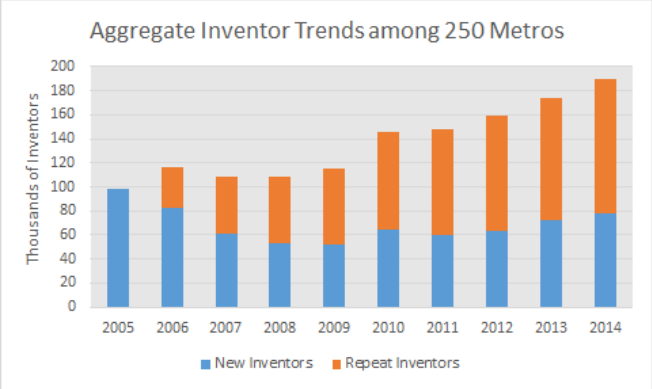
In fact, one of the "devil is in the details" discoveries of this study is how there tends to be concentrations of talent for specific disciplines spread throughout the country. This is unsurprising in the general sense, but the specifics matter.

For example, my own region of South Central Pennsylvania (greater Harrisburg, Lancaster and York) claims 11% of all the inventors and 27% of all the patents in the art class of 439 [Electrical Connectors]. This art class has inventors in 206 of the 250 metros studied, but just three (all within about a 30 minute drive of each other) have nearly an eighth of all the inventors. This is an extraordinary concentration of talent.

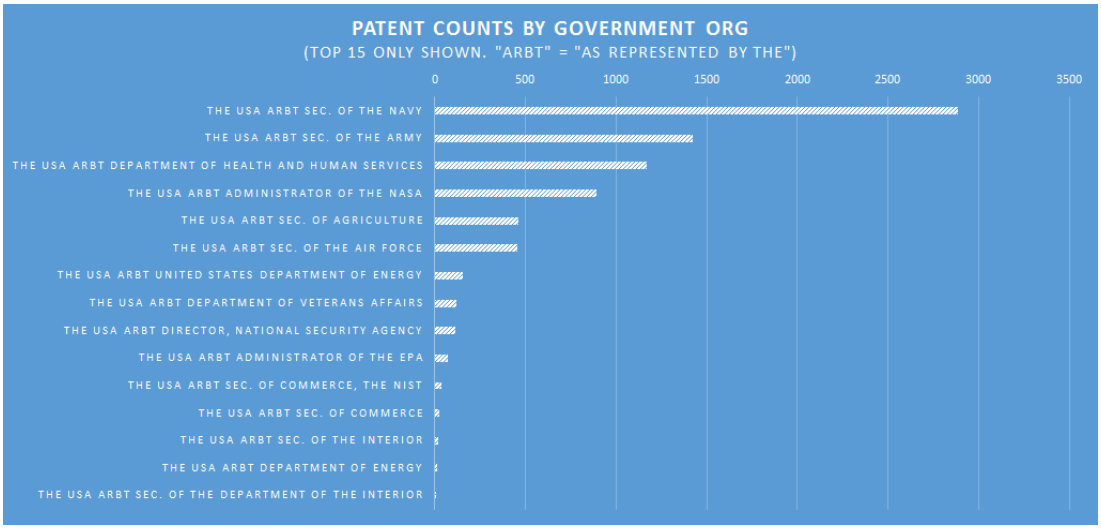
This is not the only such example. For a very different case (pun intended) consider the art class of 202 which is for "Distillation Apparatus". In this art class, 51 communities can claim at least one inventor. However, if you want to find someone skilled in the art of making distillation apparatus, you can focus your search in the three communities of Houston, Chicago and Manchester-Nashua, NH. These three communities (out of 51) have 34% of all the inventors in this art class.

So, one of the surprises of the study was that it could illuminate these concentrations of talent. I, for one, would assume this to be a recruiter's dream.

What else is "newsworthy"?



This chart illustrates the relationship between first time inventors (new) and inventors who have prior awards. As you can see, the number of repeat inventors is outpacing new inventors – but both are growing year over year. (Note: the first year, 2005, does not break out the repeating inventors because this is the first year of data examined so there was no way to know which were new and which were repeaters). This chart does, however, beg the question of how our companies and/or culture are encouraging repeat inventors? And is it better to encourage new inventors or repeat inventors or both? Both is probably the desired answer. The question then becomes which efforts encourage both? As this maximizes results for the same efforts.



The US Government has filed and been awarded patents. This includes everything from the Department of the Interior to the Navy. What is a bit surprising is the breadth of that ownership. There are 382 Federal Government entities holding patents. Of these 372 of them a registered in the Washington, DC metro region (no surprise there).

As the above chart clearly shows, however, that the vast majority of the patents held by the US Government related to military applications (presumably) as the vast majority (~60%) are held in aggregate by the Army, Navy and Air Force.

It is worth noting that the Department of Health and Human Services (behind military) is the next highest ranking with 15% of all US Gov patents. The majority of these are held by the National Institutes of Health (NIH) and Centers for Disease Control (CDC).

One of the findings, as related in the Introduction, has to do with the fact that inventors and the assignee to whom their patent is assigned – are frequently NOT in the same metro region. Of course, this makes perfect sense if you consider a company like IBM that has research and other technical centers all over the world. Inventors living in and around Research Triangle Park in North Carolina, for example, may work for IBM and so their patent is assigned to IBM which is based in state of New York.

This was one of the key drivers for this research – to focus on inventor location – not owner location.

One of the Indices in the study is the "Home Team" index which examines the degree to which the inventors and their assignees are co-resident in the same metro region. This was a more complex analysis than it first appeared to be. However, in the end, the study found that Billings, Montana did the best at having inventors and their assignees both in Billings. With that said, Billings only had 69 patents awarded over the entire 10 year period. What is impressive is that of the 37 assignees of those patents, 22 of them (59%) are part of the Billings metro region. This places them well above the 19.1% to 39.6% that represents one standard of deviation from the mean of the bell curve.

Houston, ranked 2nd on the Home Team Index had 1359 local assignees (53%) of the 2563 assignees of patents by local inventors. Contrast this with the metro region around Hagerstown, MD where there are only 12 local assignees (8%) of the 149 total assignees of patents by local inventors.

This "dispersion" of inventive talent from the patent owner is widespread. Nationally, (among the targeted 250 metro regions) there were 155,690 total assignees. Only 55,784 of these were in the same metro region as the inventor whose patents they held. This is only 35.8% of the assignees being "in the Home Team". This is only a little better than a third of the time. Or stated conversely, about two thirds of the time, you can't find the inventive talent in the same place as the headquarters of the company that owns the patent.

So, if you want to know where the most inventive talent is for any given industry, the Inventiveness Index is the place to find it.

ABOUT THE DOCUMENT

The section at the end of this document titled "***Methods and Sources***" details the methods, data sources and assumptions used. However, as a brief overview, these are the generalities of that process:

1. Download the US PTO Grant RedBook raw data in XML (350GB for 10 years) then transform and load that to a SQL database.
2. Download assorted other population, business and CBSA (Core-Based Statistical Area) data sets.
3. Merge these datasets to produce the various reports, lists and charts contained herein.

This report is divided into several sections to aid consumption. Following this Introduction, is the "***Executive Summary***" section.

Of course, the report lists metropolitan areas by simple measures like counts of inventors or patents. The report also uses a few other indices for ranking. See the "***Indices***" section for the full explanation of these indices.

For those readers who are unfamiliar with the patent process, which is useful to understanding this study, the "***Patent Process Primer***" section will introduce the fundamentals of this process.

"***Just the Top 25's Please***" show only the top 25 metro areas in each ranking. To see the full listing of 250 communities for each index, and more content on this topic, download the companion reports from http://www.InventivenessIndex.com

A PATENT PROCESS PRIMER

While many, or perhaps most, of those reading this Inventiveness Index will be familiar with the process of patenting an invention, some will not. Since this process is central to understanding this report, this short section will briefly introduce the process to those readers not already familiar. If you are familiar, you are welcome to skip this section.

When an inventor believes they have invented something – they (or their employer) may believe that invention is valuable in the marketplace and having invested time, money and expertise – desire a return on that investment. The patent system of the USA guarantees a temporary monopoly (20 years) on that opportunity. In exchange, the inventor publishes their invention in a particular way so that others may learn from it and build upon it. Once the patent expires, anyone is welcome to produce and sell the same invention. This 'social contract' has fostered investment and fueled technological advancement faster than any other system in history. It has thus been instrumental in raising the general standard of living in our nation, for both the inventors and the users of their technologies.

Once an inventor decides to patent their invention – a rather lengthy and tedious process ensues. Generally, an inventor and/or their employer will engage a patent attorney who is adept at crafting this highly technical and highly legal patent application and submitting that application to the PTO (Patent and Trademark Office). The PTO (more specifically, someone called an Examiner) then reviews that application and one of three outcomes are possible. The PTO can award a patent, deny the patent or the applicant/inventor can abandon (withdrawal) the application.

Generally speaking, the majority of applications are initially denied by the Examiner in what is called a "Non-Final Rejection" whereby they say, basically, the inventor is not entitled to the patent because of a failure to meet the essential requirements of patentability – but is willing to be persuaded by the applicant if they can make a good argument. The applicant and their patent counsel then collaborate to make a convincing argument and, eventually, the patent is either awarded, abandoned, or finally denied.

Throughout this process, the PTO records a wide range of facts about the patent. For example, the PTO classifies patents in the broad measure of type of patent. These types are (in descending rank): Utility, Design, Plant and Reissue. Additionally, they 'classify' a patent by the "art" of the patent. There are multiple such classifications systems such as the US classification system – but also a European one, and two kinds of international patent classification systems. For the purposes of this study, the US Classification system was used which is comprised of over 470 different major classifications and thousands of sub-classifications.

The PTO records the name and address of the Inventor, the Applicant (sometimes they are different, but are typically the same). They record the Assignee (the company, government or person who will own the patent if it is awarded) and the Assignee's address. They record all kinds of dates relative to the submission and processing of the application.

The PTO also pays a lot of attention to what is called "Prior Art". That is their term for the history of all the patents, patent applications and 'published non-patent literature' that has gone before. These things are cited as "reference citations" by both the Applicant and the Examiner for various reasons. This list of references are vital to the award or denial of a patent. They are also suggestive of value of a patent, but that is beyond the scope and purpose of this study.

Once a patent is awarded, it is assigned a unique patent number and is published. The PTO issues and publishes these patent awards once a week on a Tuesday. When they do, they also make all the above data and more available for bulk download (though accessing, download, parsing and processing this data is absolutely NOT for the faint of heart).

For this study, over 2.5 million patents have been downloaded, parsed and processed into a form that was loaded into a database. Each patent downloaded consisted of dozens of facts about that patent including the kinds of facts noted above. At this time, the PTO is issuing just under 7000 patents per week.

It is important to note that patent applications were NOT downloaded and included in this study. That data collection is larger than the patent award collection. While applications are also suggestive of talent and competency in a given community, only patents that are awarded can ultimately fuel a business and so only these were considered for this study.

INDICES

This Index examines and ranks many factors about the Inventiveness of 250 metropolitan regions across the USA.

The Composite Index totals nine individual indices for these Metro Regions. These equally weighted nine indices are:

- Inventors
- Patents
- Inventor Density
- Total Entities
- IP-Company Density
- Art Class Diversity
- Tops-in-Class
- Home Team
- Up & Coming

Why 250 communities? Because invention lives everywhere – because inventors live everywhere. The list could stop at the top 25 or 50 or 100 – but doing so would eliminate some very inventive communities with particular competencies. Going deeply into the list allows for illumination of more centers of unique competency and, along the way, surprises. However, while 250 communities are scored, down to communities as small as 150k people, this printed report focuses primarily on the top 25 in each index component. The full list of indices, and other data and documents, are available on the www.InventivenessIndex.com website.

The nine (and more) Indices:

The obvious measures of total **Inventors** and **Patents** are ranked. The Index shows these totals by metro region over the ten years from 2005 to 2014 inclusive. However, it is also useful to look at these numbers year by year for a community as it shows trends. However, these Inventor population trends may or may not be coincident with general population movements in the country.

So, the index also measures "**Inventor Density**." This Inventor Density ranking (both total for the 10 year period and year by year) measures how many Inventors reside in a community as a percentage or per-capita of all residents of that metropolitan area. Being able to trend movements in this Indexed value, particularly for specific areas of invention (called "Art Classes" by the Patent Office), holds the potential to illuminate emerging centers of innovation – but also to uncover growing concentrations of expertise that are not developing startup ecosystems when perhaps they could be.

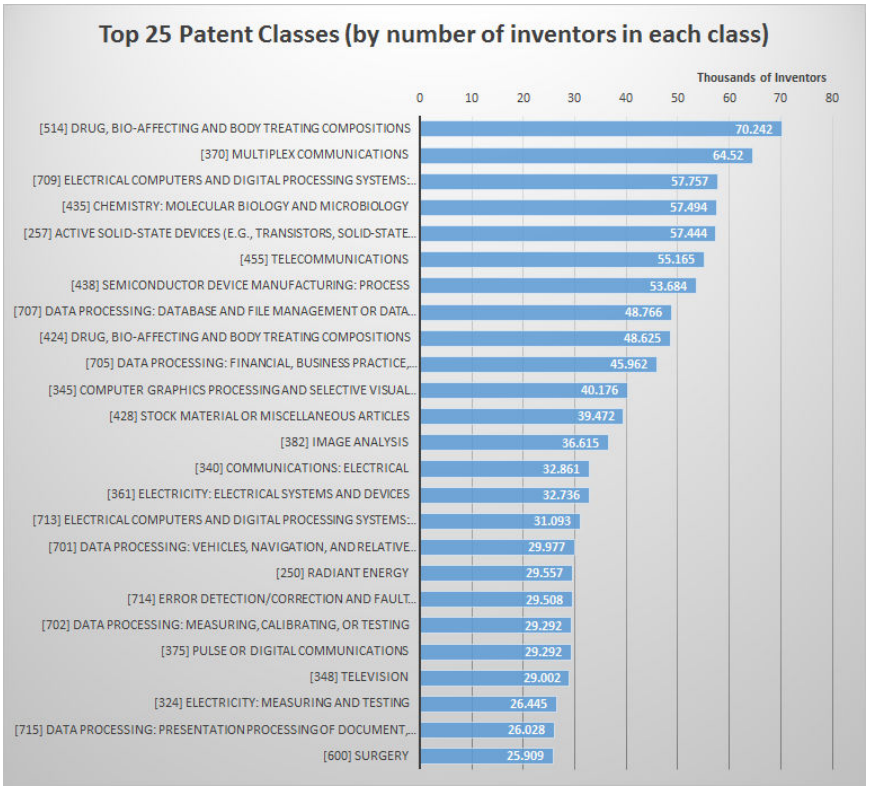
The "**Total Entities**" index reveals the count of entities in a given metro region – that hold at least one patent in the ten year period. It doesn't consider how many patents each entity holds – just that they have some level of patent activity. This index ranks the communities by total entities that are active – but also reports that total broken down into Companies, Higher Education Institutions, Government Organizations and Non-Profit Foundations (some of which are Higher Ed intellectual property holding foundations).

Similar to the Inventor Density Index, the "**IP-Company Density**" Index reveals the ratio of Intellectual Property (IP) based companies to the total number of companies in that metro region. This measure of 'density' says something about the general nature of that metro region in terms of their IP-based ecosystems.

As mentioned in the section "A Patent Processing Primer" – all patents are classified via a number of different classification systems. For this study the US standard classification system was used which has 470+ classes of art identified. One of the indices measured, then, is art class. For example, art class 380 is for patents related to 'Cryptography' (the scrambling and unscrambling of data and messages). Art class 362 relates to patents on 'Illumination'. This Index looks at this measure for a variety of reasons.

In one measure, "**Art Class Diversity**," each community that produces patents may be more

singular (only seems to make patents related to making furniture for example) or diverse (makes patents that involve, for example, 249 different art classes). This Index ranks each community on their Class Diversity as a measure of the diversity of talent in that community.



Another Art Class related index is the "**Patent Class Concentration**" Index (not counted in the Composite Index). This index looks at a metro region and all the art classes for which its inventors have patents – with an eye to answering the question "Is this community 'monolithic' in its inventiveness?" which is to say it is the inverse of the Class Diversity index – in a way. This is a bit nuanced, so let's be clear.

The Class Diversity index simply counts how many different art classes are represented by the patents in a metro region – without regard to the number of patents in any class. It is possible for a region to have patents across, for example, 172 art classes – but have the vast majority in a single or a few classes and a very small quantity (1 or 2) in all the other classes. For this reason, the Patent Class Concentration Index ranks the most "concentrated" communities – or – those communities where the largest percentage of their patents fall into a single art class.

Additionally, the "**Tops in Class**" Index looks at the intersection of communities and art classes another way. In any given art class, there are going to be many regions that have some level of patent activity in that art class. However, there is going to be one community that has the most patents in that art class. These communities are "Tops in Class" in that art. Some communities are Tops in Class in more than one art. This Index looks at which communities are Tops in Class in the most classes. This is a measure of both diversity of inventiveness AND excellence or productivity.

Another important index is the Local Assignee to All Assignee ratio which is labeled the "**Home Team**" Index. As mentioned in the Introduction, in the Inventor almost always turns over ownership of the patent to an Assignee (typically an employer). But in only 4 out of 10 (on average) cases do the Inventor and the Assignee share the same metro locality. This Home Team Index is a score for each community that supports a ranking of those communities who do a better job than others of having the Inventor and Assignee in the same place. On the other hand, this may also indicate a certain kind of "insulation" or "isolation" for that community.

Each of the prior indices score a particular metric based on the ten year period in aggregate. But what about trends over the ten years? For example, which metro region is growing fastest in terms of Inventor Density? Or adding diversity to their talent pool (by measure of patent class growth). Or in terms of new assignees from year to year (may suggest new business creation)?

These sub-indices are all ranked by community and then a composite trend score is used to rank the communities by trajectory. This index is called the "**Up & Coming**" Index.

More details are explained in the Methods and Sources section, but a brief comment on the Up &

Coming Index method. The 'trajectory' score for each community is based on using the history of data for that index and community and then doing a least squares linear trend calculation to create a score (slope) that indicates if those ten years are generally inclining or declining and how much.

All nine of these indices are combined for a final Composite Index which provides the overall community Inventiveness Index score/ranking.

So, without further ado, the Composite Index and component indices…

JUST THE TOP 25'S PLEASE

RANKED INDICES:

COMPOSITE INDEX:

Rank	www.InventivenessIndex.com Metro Region	Rankings in Each Index									Tot Score
		Inventors	Patents	Inventor Density	Entities	IP Company Density	Class Diversity	Tops in Class	Home Team	Up & Coming	
1	**San Diego-Carlsbad-San Marcos, CA [41740]**	7	6	18	8	12	14	18	12	3	98
2	San Francisco-Oakland-Fremont, CA [41860]	2	2	8	3	7	5	6	74	5	112
3	San Jose-Sunnyvale-Santa Clara, CA [41940]	1	1	1	2	2	16	1	15	78	117
4	Seattle-Tacoma-Bellevue, WA [42660]	5	5	12	12	36	11	19	17	1	118
5	Boston-Cambridge-Quincy, MA-NH [14460]	4	4	17	4	9	3	9	8	66	124
6	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	9	9	70	6	28	4	7	23	28	184
7	Houston-Sugar Land-Baytown, TX [26420]	10	12	74	10	62	12	5	2	12	199
8	Washington-Arlington-Alexandria, DC-VA-MD-WV [47900]	13	14	85	7	69	13	29	14	27	271
9	Detroit-Warren-Livonia, MI [19820]	8	10	50	13	50	7	3	6	125	272
10	Dallas-Fort Worth-Arlington, TX [19100]	11	11	92	9	88	10	36	11	19	287
11	Boulder, CO [14500]	21	20	2	21	4	34	32	155	6	295
12	Austin-Round Rock, TX [12420]	12	8	15	20	47	40	62	83	17	304
13	Chicago-Naperville-Joliet, IL-IN-WI [16980]	6	7	79	5	96	1	4	4	103	305
14	Minneapolis-St. Paul-Bloomington, MN-WI [33460]	19	17	58	17	89	9	10	7	82	308
15	Hartford-West Hartford-East Hartford, CT [25540]	33	36	41	43	41	25	25	55	10	309
16	Rochester, NY [40380]	22	23	20	42	48	39	8	64	44	310
17	Phoenix-Mesa-Scottsdale, AZ [38060]	14	13	65	16	46	8	62	68	31	323
18	Salt Lake City, UT [41620]	47	52	62	30	31	45	17	33	7	324
19	New York-Northern New Jersey-Long Island, NY-NJ-PA [35620]	3	3	86	1	73	2	2	3	159	332
20	Portland-Vancouver-Beaverton, OR-WA [38900]	17	15	31	19	90	20	62	31	51	336
21	Cleveland-Elyria-Mentor, OH [17460]	30	33	82	18	35	15	15	29	96	353
22	Denver-Aurora, CO [19740]	20	21	55	14	104	17	38	84	4	357
23	Durham, NC [20500]	16	16	3	29	25	29	62	182	2	364
24	Oxnard-Thousand Oaks-Ventura, CA [37100]	35	32	27	28	16	30	48	76	77	369
25	Atlanta-Sandy Springs-Marietta, GA [12060]	15	18	91	11	147	6	13	34	55	390

NOTES: The number in []'s following each metro region name is the CBSA ID assigned to that metro region by the US Census Bureau. Cells highlighted in red text on a pale red background, highlight top 25 rankings in that index. Metro regions shown in **bold black text on a light green background** – are regions that ranked in the top 25 of all nine indices. Metro regions shown in white text on a dark green background – are regions that ranked in the top 25 for eight out of the nine indices.

COMMUNITIES BY INVENTOR COUNTS[3]:

Rank	Metro Region	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
1	San Jose-Sunnyvale-Santa Clara, CA [41940]	9943	12036	11186	11490	12163	15345	15766	16763	20002	23718	69684
2	San Francisco-Oakland-Fremont, CA [41860]	6957	8734	8031	8371	9125	11859	12190	13628	16678	19653	57991
3	New York-Northern New Jersey-Long Island, NY-NJ-PA [35620]	6415	7859	7242	7540	7797	10182	10089	11083	12798	13569	49602
4	Boston-Cambridge-Quincy, MA-NH [14460]	5110	6175	5624	5896	6075	8076	8304	9093	10535	11452	39956
5	Seattle-Tacoma-Bellevue, WA [42660]	2910	4046	4611	5471	6922	8347	7945	8757	9858	11655	36499
6	Chicago-Naperville-Joliet, IL-IN-WI [16980]	3970	4493	4123	3878	4034	5132	5198	5726	6239	6915	27497
7	San Diego-Carlsbad-San Marcos, CA [41740]	2977	3562	3535	3518	3648	5028	5306	6152	7370	8215	25098
8	Detroit-Warren-Livonia, MI [19820]	2931	3142	2809	2681	2719	3330	3218	3631	4124	4398	19185
9	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	2532	3013	2859	2679	3043	3736	3622	3856	4418	4588	18641
10	Houston-Sugar Land-Baytown, TX [26420]	2280	2796	2757	2776	2834	3518	3563	3773	4425	4923	18335
11	Dallas-Fort Worth-Arlington, TX [19100]	2439	2959	2589	2506	2573	3319	3300	3566	4089	4446	18038
12	Austin-Round Rock, TX [12420]	2456	2763	2750	2917	3292	3914	3931	3981	4459	4645	17054
13	Washington-Arlington-Alexandria, DC-VA-MD-WV [47900]	1774	2209	2031	2101	2221	3038	3149	3213	3654	4042	16717
14	Phoenix-Mesa-Scottsdale, AZ [38060]	2171	2579	2446	2397	2359	2921	2977	3174	3282	3555	15242
15	Atlanta-Sandy Springs-Marietta, GA [12060]	1670	2034	1881	1853	1960	2621	2736	2798	3401	3642	14061
16	Durham, NC [20500]	1634	2054	1951	2172	2398	2935	3112	3031	3291	3652	13601
17	Portland-Vancouver-Beaverton, OR-WA [38900]	1900	2402	2159	2276	2309	2527	2617	2716	3131	3407	12613
18	Raleigh-Cary, NC [39580]	1447	1821	1749	1980	2182	2624	2775	2750	2982	3269	12443
19	Minneapolis-St. Paul-Bloomington, MN-WI [33460]	1564	1862	1717	1700	1660	2236	2441	2507	2966	3174	11456
20	Denver-Aurora, CO [19740]	1157	1365	1235	1223	1268	1745	1856	2052	2431	2651	10032
21	Boulder, CO [14500]	1359	1627	1431	1377	1428	1711	1680	1766	2150	2391	9445
22	Rochester, NY [40380]	1555	1713	1734	1522	1563	2014	1891	2015	2095	2187	8868
23	Cincinnati-Middletown, OH-KY-IN [17140]	1381	1508	1326	1213	1338	1755	1716	1778	1889	1907	8192
24	Baltimore-Towson, MD [12580]	1016	1174	1029	1002	1047	1353	1297	1398	1479	1659	7490
25	Ann Arbor, MI [11460]	947	1008	945	977	953	1201	1183	1425	1644	1781	6921

[3] Totals by Metro Region do not match the sum for the ten year period for that region because the same inventor can appear multiple times during the period. The total counts unique inventors over the period. Also, note that there is some imprecision in these numbers because they are based on the Inventor's first and last names and the PTO is not always consistent in spellings. ☺

COMMUNITIES BY PATENT COUNTS:

Rank	Metro Region	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
1	San Jose-Sunnyvale-Santa Clara, CA [41940]	8564	11077	9917	10058	10916	14305	14816	16503	19190	23044	138390
2	San Francisco-Oakland-Fremont, CA [41860]	6519	8444	7680	7753	8466	11521	11764	13494	15645	18555	109841
3	New York-Northern New Jersey-Long Island, NY-NJ-PA [35620]	4903	6390	5590	6000	6198	8619	8676	9640	11162	12123	79301
4	Boston-Cambridge-Quincy, MA-NH [14460]	3442	4503	3964	4085	4318	6099	6346	7065	8091	8826	56739
5	Seattle-Tacoma-Bellevue, WA [42660]	1841	2819	2909	3263	4176	5201	4734	5394	6304	7405	44046
6	San Diego-Carlsbad-San Marcos, CA [41740]	2113	2753	2632	2405	2531	3898	4221	5140	6300	7327	39320
7	Chicago-Naperville-Joliet, IL-IN-WI [16980]	2578	3067	2679	2598	2764	3598	3740	4227	4753	5254	35258
8	Austin-Round Rock, TX [12420]	1864	2220	2155	2363	2602	3131	3151	3367	3743	3951	28547
9	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	1840	2297	2163	2018	2226	2909	2971	3182	3653	3740	26999
10	Detroit-Warren-Livonia, MI [19820]	2231	2522	2115	1977	1975	2608	2643	3159	3572	3741	26543
11	Dallas-Fort Worth-Arlington, TX [19100]	1845	2277	1999	1899	1881	2519	2600	3008	3445	4042	25515
12	Houston-Sugar Land-Baytown, TX [26420]	1576	1952	1889	1854	1911	2601	2609	2821	3320	3739	24272
13	Phoenix-Mesa-Scottsdale, AZ [38060]	1568	1906	1763	1800	1838	2307	2387	2557	2746	3102	21974
14	Washington-Arlington-Alexandria, DC-VA-MD-WV [47900]	1389	1713	1522	1602	1715	2312	2399	2650	2886	3242	21430
15	Portland-Vancouver-Beaverton, OR-WA [38900]	1534	2067	1832	1825	1744	2140	2165	2312	2522	2867	21008
16	Durham, NC [20500]	1111	1538	1320	1545	1730	2319	2399	2552	2630	3160	20304
17	Minneapolis-St. Paul-Bloomington, MN-WI [33460]	1373	1696	1496	1472	1460	2095	2375	2384	2669	2889	19909
18	Atlanta-Sandy Springs-Marietta, GA [12060]	1209	1548	1337	1385	1494	2094	2138	2322	2861	3069	19457
19	Raleigh-Cary, NC [39580]	990	1381	1199	1432	1609	2129	2182	2334	2425	2934	18615
20	Boulder, CO [14500]	1158	1431	1189	1110	1233	1496	1470	1633	1914	2255	14889
21	Denver-Aurora, CO [19740]	961	1176	1033	1020	1118	1552	1615	1836	2133	2439	14883
22	Santa Cruz-Watsonville, CA [42100]	861	1152	1027	1061	1117	1469	1595	1734	1874	2141	14031
23	Rochester, NY [40380]	1095	1271	1141	977	1030	1428	1461	1746	1815	1915	13879
24	Ann Arbor, MI [11460]	867	974	868	869	872	1216	1325	1647	1784	1904	12326
25	Cincinnati-Middletown, OH-KY-IN [17140]	875	969	845	822	887	1294	1218	1308	1442	1519	11179

COMMUNITIES BY INVENTOR DENSITY[4]:

		Inventors Per 1000 People					
Rank	Metro Region	2010	2011	2012	2013	2014	Average
1	San Jose-Sunnyvale-Santa Clara, CA [41940]	8.35	8.43	8.83	10.37	12.15	9.626
2	Boulder, CO [14500]	5.81	5.59	5.78	6.93	7.63	6.348
3	Durham, NC [20500]	5.82	6.03	5.77	6.17	6.73	6.104
4	Santa Cruz-Watsonville, CA [42100]	3.95	4.11	4.37	5.3	5.93	4.732
5	Greeley, CO [24540]	4.6	4.38	4.33	4.9	5.31	4.704
6	Ann Arbor, MI [11460]	3.48	3.39	4.06	4.64	4.99	4.112
7	Rochester, MN [40340]	3.66	3.58	3.82	4.1	4.03	3.838
8	San Francisco-Oakland-Fremont, CA [41860]	2.74	2.77	3.05	3.68	4.28	3.304
9	Fort Collins-Loveland, CO [22660]	3.2	2.89	2.83	3.41	3.59	3.184
10	Burlington-South Burlington, VT [15540]	3.29	2.79	2.71	2.85	2.88	2.904
11	Oshkosh-Neenah, WI [36780]	2.95	3.16	2.63	2.71	2.89	2.868
12	Seattle-Tacoma-Bellevue, WA [42660]	2.43	2.27	2.46	2.73	3.17	2.612
13	Raleigh-Cary, NC [39580]	2.32	2.39	2.31	2.45	2.63	2.42
14	Appleton, WI [11540]	2.49	2.57	2.19	2.24	2.32	2.362
15	Austin-Round Rock, TX [12420]	2.28	2.21	2.17	2.36	2.39	2.282
16	Iowa City, IA [26980]	1.9	2.15	1.96	2.08	2.48	2.114
17	Boston-Cambridge-Quincy, MA-NH [14460]	1.77	1.8	1.96	2.24	2.42	2.038
18	San Diego-Carlsbad-San Marcos, CA [41740]	1.62	1.69	1.93	2.29	2.52	2.01
19	Laredo, TX [29700]	1.41	1.54	1.9	2.15	2.46	1.892
20	Rochester, NY [40380]	1.87	1.75	1.86	1.93	2.02	1.886
21	Trenton-Ewing, NJ [45940]	1.68	1.57	1.75	2.14	2.26	1.88
22	Manchester-Nashua, NH [31700]	1.53	1.64	1.52	1.76	2.06	1.702
23	Peoria, IL [37900]	1.2	1.47	1.34	1.35	1.66	1.404
24	Racine, WI [39540]	1.35	1.37	1.36	1.29	1.57	1.388
25	Boise City-Nampa, ID [14260]	1.41	1.34	1.24	1.35	1.43	1.354

[4] Using Population Estimates from Census Bureau each year with total inventors in that metro each year to yield Inventors per thousand people, per year; then averaged over the five year period. Some Trend data is also shown for reference. More Trend related analysis in the "Up and Coming" Index and the "Going Deeper" sections below.

COMMUNITIES BY TOTAL ENTITIES:

		97.3%	0.3%	0.5%	1.9%	
Rank	Metro Region	Companies w/Patents	Foundations w/Patents	Gov Entities w/Patents	Higher Ed w/Patents	Total Entities
1	New York-Northern New Jersey-Long Island, NY-NJ-PA [35620]	6367	20	2	95	6484
2	San Jose-Sunnyvale-Santa Clara, CA [41940]	4726	7		49	4782
3	San Francisco-Oakland-Fremont, CA [41860]	4424	8		98	4530
4	Boston-Cambridge-Quincy, MA-NH [14460]	3864	9	1	44	3918
5	Chicago-Naperville-Joliet, IL-IN-WI [16980]	3227	7		26	3260
6	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	2964	18		38	3020
7	Washington-Arlington-Alexandria, DC-VA-MD-WV [47900]	1973	16	372	32	2393
8	San Diego-Carlsbad-San Marcos, CA [41740]	2285	4		12	2301
9	Dallas-Fort Worth-Arlington, TX [19100]	1930	1		19	1950
10	Houston-Sugar Land-Baytown, TX [26420]	1815	3		27	1845
11	Atlanta-Sandy Springs-Marietta, GA [12060]	1614	3	2	12	1631
12	Seattle-Tacoma-Bellevue, WA [42660]	1581	2		17	1600
13	Detroit-Warren-Livonia, MI [19820]	1447	1	1	7	1456
14	Denver-Aurora, CO [19740]	1338	2		26	1366
15	Miami-Fort Lauderdale-Pompano Beach, FL [33100]	1309	1		13	1323
16	Phoenix-Mesa-Scottsdale, AZ [38060]	1228	1		49	1278
17	Minneapolis-St. Paul-Bloomington, MN-WI [33460]	1264	5		7	1276
18	Cleveland-Elyria-Mentor, OH [17460]	1006	8		12	1026
19	Portland-Vancouver-Beaverton, OR-WA [38900]	946	1	1	20	968
20	Austin-Round Rock, TX [12420]	903	4		42	949
21	Boulder, CO [14500]	852	1		18	871
22	Cincinnati-Middletown, OH-KY-IN [17140]	825	2		6	833
23	Bridgeport-Stamford-Norwalk, CT [14860]	703			2	705
24	Las Vegas-Paradise, NV [29820]	691			9	700
25	Milwaukee-Waukesha-West Allis, WI [33340]	656	8		5	669
26	Baltimore-Towson, MD [12580]	637	4		26	667
27	Pittsburgh, PA [38300]	618	3		38	659
28	Oxnard-Thousand Oaks-Ventura, CA [37100]	658				658
29	Durham, NC [20500]	629	1		22	652
30	Salt Lake City, UT [41620]	629	4		11	644
31-250	…	…	…	…	…	…
	Grand Total (all 250 Metros)	**79255**	**266**	**382**	**1541**	**81444**

A few notes are necessary on this particular table.

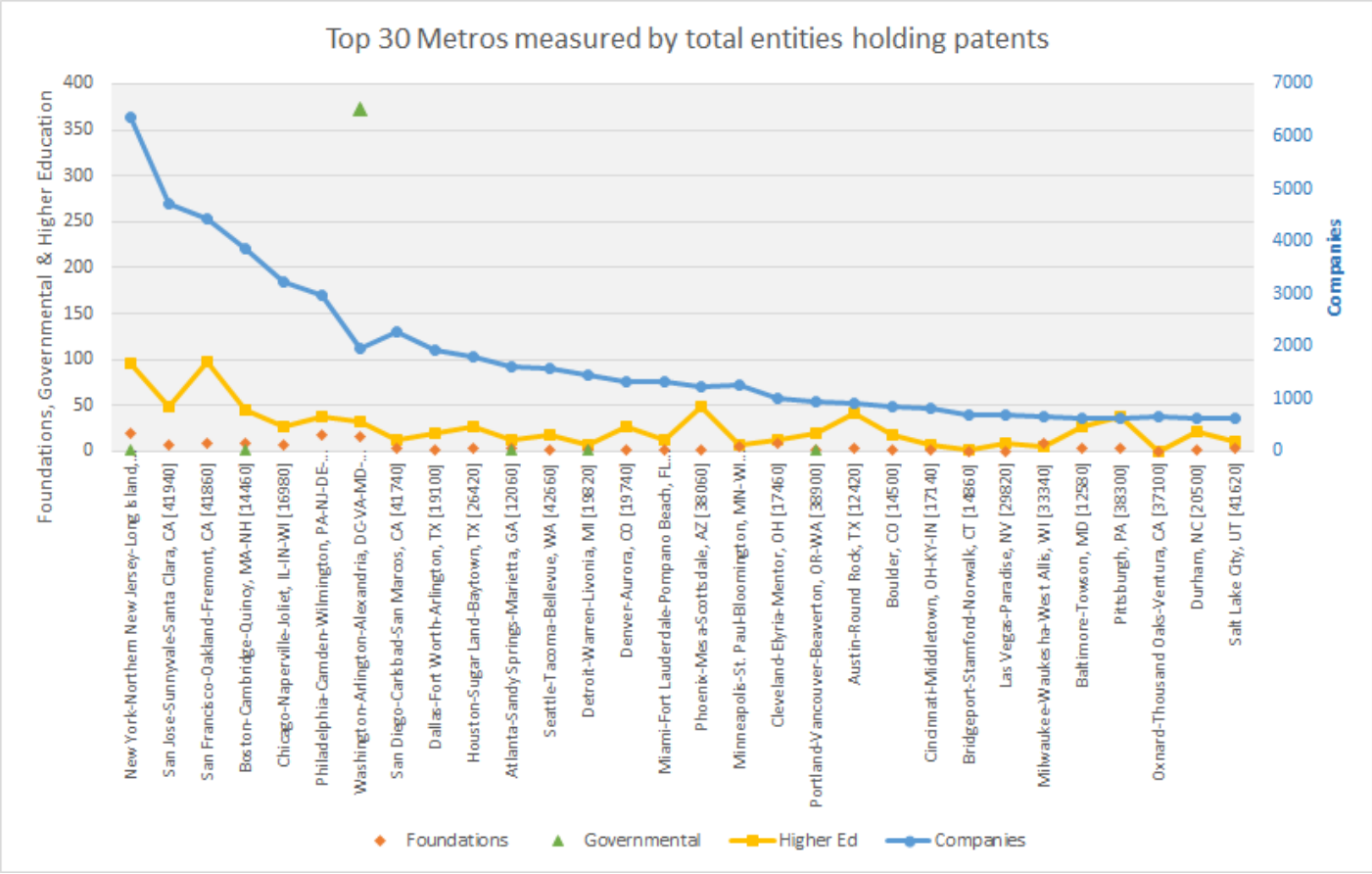
First, unlike the other tables, this table is NOT "inventor-centric" – it is Assignee centric. That is, it is looking at the location of who the patent is assigned to rather than the location of the inventor as is the case for virtually all of the other tables.

Second, 30 metros are included instead of 25 because, in this particular case, it is useful to note that these 30 top metros have 66.8% of all the entities holding patents nationally. This is significant.

Third and perhaps most importantly, there is no question that these entity numbers are ultimately not accurate, but they are the best that is reasonably possible. A brief explanation…

If a patent has an Assignee, the PTO data records this. However, when a particular Assignee holds more than one patent, it is almost a certainty that the name of that Assignee will be recorded in the data differently for each patent (for example: some will have "Incorporated" where others will have "inc" or some will have "L.L.C." where others will have "llc" – but most importantly – there is an astonishing quantity of misspelled company names that no programmatic code can reasonably correlate to the correct name). This lack of data hygiene is the result of a number of causes.

The corpus of Assigned patents comprises 2046481 rows of data for the target ten year period. Within these roughly 2 million records, the target 250 metro communities comprise 931747 rows. Within these rows are 83066 entities by way of unique name spelling. These 83066 unique entries have been programmatically reduced which sometimes reduce five unclean entries for the same Assignee to one, and sometimes it only reduces it to two or three or four. For this reason, short of manually matching these 70k to 80k names, there will be some inaccuracy in these numbers. With that said, it is unlikely that this "squishiness" in the numbers is significant enough to materially alter the overall rankings.



COMMUNITIES BY DENSITY OF INTELLECTUAL PROPERTY BASED COMPANIES:

Rank	MetroRegion	Total Companies in Metro based on tax filings[5]	IP-Based Companies	Percent of all Companies
1	Laredo, TX [29700]	2870	237	8.26%
2	San Jose-Sunnyvale-Santa Clara, CA [41940]	55490	4283	7.72%
3	Dover, DE [20100]	3380	223	6.60%
4	Boulder, CO [14500]	23470	747	3.18%
5	Manchester-Nashua, NH [31700]	8340	252	3.02%
6	Trenton-Ewing, NJ [45940]	11630	299	2.57%
7	San Francisco-Oakland-Fremont, CA [41860]	152530	3887	2.55%
8	Santa Cruz-Watsonville, CA [42100]	9680	247	2.55%
9	Boston-Cambridge-Quincy, MA-NH [14460]	140140	3519	2.51%
10	Blacksburg-Christiansburg-Radford, VA [13980]	3470	87	2.51%
11	Yuba City, CA [49700]	3900	95	2.44%
12	San Diego-Carlsbad-San Marcos, CA [41740]	84670	2041	2.41%
13	Reno-Sparks, NV [39900]	16700	383	2.29%
14	Greeley, CO [24540]	17390	360	2.07%
15	Ann Arbor, MI [11460]	17370	352	2.03%
16	Oxnard-Thousand Oaks-Ventura, CA [37100]	31030	582	1.88%
17	New Haven-Milford, CT [35300]	18640	332	1.78%
18	State College, PA [44300]	3540	63	1.78%
19	Worcester, MA [49340]	15570	272	1.75%
20	Palm Bay-Melbourne-Titusville, FL [37340]	18040	287	1.59%
21	Racine, WI [39540]	6160	97	1.57%
22	Elkhart-Goshen, IN [21140]	7580	116	1.53%
23	Bridgeport-Stamford-Norwalk, CT [14860]	42220	637	1.51%
24	Las Vegas-Paradise, NV [29820]	40720	602	1.48%
25	Durham, NC [20500]	37160	541	1.46%

[5] Data Source: IRS Website Data Download [https://www.irs.gov/uac/SOI-Tax-Stats-Individual-Income-Tax-Statistics-2013-ZIP-Code-Data-%28SOI%29]. Data extracted then matched via zip code and locality to CBSA lists and rolled up to CBSA totals.

COMMUNITIES BY PATENT CLASS DIVERSITY[6]:

		Number of different Classes for which the inventors in this metro have been awarded patents. (a measure of diversity of talent)												
Rank	Metro Region	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total	Trend	Trend Rank
1	Chicago-Naperville-Joliet, IL-IN-WI [16980]	364	352	361	344	356	372	379	380	388	394	498	4.47	43
2	New York-Northern New Jersey-Long Island, NY-NJ-PA [35620]	366	372	368	360	376	381	382	379	375	394	496	2.42	131
3	Boston-Cambridge-Quincy, MA-NH [14460]	308	325	313	314	310	324	322	341	358	347	480	4.61	38
4	San Francisco-Oakland-Fremont, CA [41860]	314	323	310	316	309	327	331	338	347	351	467	4.27	55
5	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	298	296	297	285	285	303	305	306	316	337	467	3.72	71
6	Atlanta-Sandy Springs-Marietta, GA [12060]	250	267	243	234	240	277	276	285	303	302	454	6.62	9
7	Detroit-Warren-Livonia, MI [19820]	285	303	276	275	281	294	290	311	306	315	453	3.18	99
8	Phoenix-Mesa-Scottsdale, AZ [38060]	251	266	256	252	245	266	286	279	307	294	445	5.53	21
9	Minneapolis-St. Paul-Bloomington, MN-WI [33460]	257	276	259	267	240	276	292	282	303	302	444	4.97	31
10	Seattle-Tacoma-Bellevue, WA [42660]	238	261	230	240	254	282	275	289	302	289	441	7.12	5
11	Dallas-Fort Worth-Arlington, TX [19100]	252	258	246	235	250	277	280	288	309	299	441	6.98	8
12	Houston-Sugar Land-Baytown, TX [26420]	244	244	240	251	244	270	276	288	283	285	438	5.96	15
13	Washington-Arlington-Alexandria, DC-VA-MD-WV [47900]	231	246	224	222	230	263	256	252	269	266	434	4.55	41
14	San Diego-Carlsbad-San Marcos, CA [41740]	249	267	253	263	249	284	269	291	290	292	433	4.79	36
15	Cleveland-Elyria-Mentor, OH [17460]	226	218	206	222	219	233	245	235	264	251	432	4.7	37
16	San Jose-Sunnyvale-Santa Clara, CA [41940]	277	285	271	275	278	297	298	290	307	311	432	3.9	66
17	Denver-Aurora, CO [19740]	224	226	211	210	210	236	258	259	271	272	425	7.01	7
18	Cincinnati-Middletown, OH-KY-IN [17140]	235	225	212	213	239	262	247	230	243	247	418	2.72	119
19	Riverside-San Bernardino-Ontario, CA [40140]	198	202	187	191	194	222	212	233	244	238	413	5.91	16
20	Portland-Vancouver-Beaverton, OR-WA [38900]	205	223	226	216	231	231	249	241	256	250	412	4.91	33
21	Pittsburgh, PA [38300]	178	223	194	181	184	217	213	212	225	231	410	4.3	52
22	Miami-Fort Lauderdale-Pompano Beach, FL [33100]	205	204	200	197	198	218	240	230	228	249	407	5.23	27
23	Baltimore-Towson, MD [12580]	200	209	203	198	200	223	207	223	234	232	404	3.72	72
24	Milwaukee-Waukesha-West Allis, WI [33340]	185	192	174	171	194	203	216	221	220	238	401	6.38	11
25	Hartford-West Hartford-East Hartford, CT [25540]	180	208	179	183	181	207	204	213	236	241	398	6.08	13

[6] Total column does not match arithmetic sum of years because a patent class appears in multiple years. This total is aggregated over the full 10 year period. Trend and Trend Rank columns included as the Trend value is used to break ties in the Total column.

TOPS IN CLASS[7]:

Rank	Metro Region	Number of Art Classes For Which Metro is #1
1	San Jose-Sunnyvale-Santa Clara, CA [41940]	82
2	New York-Northern New Jersey-Long Island, NY-NJ-PA [35620]	53
3	Detroit-Warren-Livonia, MI [19820]	42
4	Chicago-Naperville-Joliet, IL-IN-WI [16980]	38
5	Houston-Sugar Land-Baytown, TX [26420]	18
6	San Francisco-Oakland-Fremont, CA [41860]	17
7	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	9
8	Rochester, NY [40380]	9
9	Boston-Cambridge-Quincy, MA-NH [14460]	8
10	Minneapolis-St. Paul-Bloomington, MN-WI [33460]	6
11	Pittsburgh, PA [38300]	5
12	Appleton, WI [11540]	4
13	Atlanta-Sandy Springs-Marietta, GA [12060]	4
14	Cincinnati-Middletown, OH-KY-IN [17140]	3
15	Cleveland-Elyria-Mentor, OH [17460]	3
16	Davenport-Moline-Rock Island, IA-IL [19340]	3
17	Salt Lake City, UT [41620]	3
18	San Diego-Carlsbad-San Marcos, CA [41740]	3
19	Seattle-Tacoma-Bellevue, WA [42660]	3
20	Tulsa, OK [46140]	3
21	Akron, OH [10420]	2
22	Baltimore-Towson, MD [12580]	2
23	Bridgeport-Stamford-Norwalk, CT [14860]	2
24	Greenville-Mauldin-Easley, SC [24860]	2
25	Hartford-West Hartford-East Hartford, CT [25540]	2
26	Indianapolis-Carmel, IN [26900]	2
27	Milwaukee-Waukesha-West Allis, WI [33340]	2
28	Peoria, IL [37900]	2
29	Washington-Arlington-Alexandria, DC-VA-MD-WV [47900]	2
30	Allentown-Bethlehem-Easton, PA-NJ [10900]	1
31	Boise City-Nampa, ID [14260]	1
32	Boulder, CO [14500]	1
33	Buffalo-Niagara Falls, NY [15380]	1
34	Chattanooga, TN-GA [16860]	1
35	Columbia, MO [17860]	1

[7] For this Index, the entire list is included since it is only 69 metro's long, and each metro – even if they are only top in the nation in a single art class, may still want to see that highlighted. The full list of all the art classes and metros is included in the "List Addendum" companion document.

36	Dallas-Fort Worth-Arlington, TX [19100]	1
37	Dayton, OH [19380]	1
38	Denver-Aurora, CO [19740]	1
39	Des Moines-West Des Moines, IA [19780]	1
40	Erie, PA [21500]	1
41	Grand Rapids-Wyoming, MI [24340]	1
42	Harrisburg-Carlisle, PA [25420]	1
43	Iowa City, IA [26980]	1
44	Las Vegas-Paradise, NV [29820]	1
45	Lexington-Fayette, KY [30460]	1
46	Ogden-Clearfield, UT [36260]	1
47	Oshkosh-Neenah, WI [36780]	1
48	Oxnard-Thousand Oaks-Ventura, CA [37100]	1
49	Providence-New Bedford-Fall River, RI-MA [39300]	1
50	Provo-Orem, UT [39340]	1
51	Raleigh-Cary, NC [39580]	1
52	Reno-Sparks, NV [39900]	1
53	Richmond, VA [40060]	1
54	Riverside-San Bernardino-Ontario, CA [40140]	1
55	Rockford, IL [40420]	1
56	San Antonio, TX [41700]	1
57	Toledo, OH [45780]	1
58	Trenton-Ewing, NJ [45940]	1
59	Wilmington, NC [48900]	1
60	Youngstown-Warren-Boardman, OH-PA [49660]	1
61	Yuba City, CA [49700]	1

HOME TEAM INDEX[8]:

Rank	Metro Region	Local Assignees	Patents Assigned Locally	Non-Local Assignees	Patents Assigned Remotely	Total Assignees	Total Patents	Assign %	Patent %
1	Billings, MT [13740]	22	37	15	32	37	69	59%	54%
2	Houston-Sugar Land-Baytown, TX [26420]	1359	14669	1204	4943	2563	19612	53%	75%
3	New York-Northern New Jersey-Long Island, NY-NJ-PA [35620]	4029	38257	3751	24084	7780	62341	52%	61%
4	Chicago-Naperville-Joliet, IL-IN-WI [16980]	2213	17626	2137	10375	4350	28001	51%	63%
5	Abilene, TX [10180]	10	20	10	15	20	35	50%	57%
6	Detroit-Warren-Livonia, MI [19820]	1020	16552	1082	4664	2102	21216	49%	78%
7	Minneapolis-St. Paul-Bloomington, MN-WI [33460]	827	6510	849	5587	1676	12097	49%	54%
8	Boston-Cambridge-Quincy, MA-NH [14460]	3088	25756	3365	22643	6453	48399	48%	53%
9	Des Moines-West Des Moines, IA [19780]	104	1602	124	666	228	2268	46%	71%
10	Kansas City, MO-KS [28140]	418	4030	486	1746	904	5776	46%	70%
11	Dallas-Fort Worth-Arlington, TX [19100]	1316	9901	1530	10006	2846	19907	46%	50%
12	San Diego-Carlsbad-San Marcos, CA [41740]	1770	17193	2178	13460	3948	30653	45%	56%
13	Spokane, WA [44060]	87	348	105	295	192	643	45%	54%
14	Washington-Arlington-Alexandria, DC-VA-MD-WV [47900]	1511	8410	1858	8841	3369	17251	45%	49%
15	San Jose-Sunnyvale-Santa Clara, CA [41940]	3687	71140	4643	46153	8330	117293	44%	61%
16	Oklahoma City, OK [36420]	144	558	182	571	326	1129	44%	49%
17	Seattle-Tacoma-Bellevue, WA [42660]	1241	25694	1661	13770	2902	39464	43%	65%
18	Knoxville, TN [28940]	182	1062	238	666	420	1728	43%	61%
19	Grand Rapids-Wyoming, MI [24340]	210	1011	274	972	484	1983	43%	51%
20	Reno-Sparks, NV [39900]	190	1534	271	1103	461	2637	41%	58%
21	Sioux Falls, SD [43620]	35	89	50	73	85	162	41%	55%
22	Cincinnati-Middletown, OH-KY-IN [17140]	590	5146	886	4826	1476	9972	40%	52%
23	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	1366	11574	2069	11984	3435	23558	40%	49%
24	Wichita, KS [48620]	88	313	83	704	171	1017	51%	31%
25	Las Vegas-Paradise, NV [29820]	283	1090	295	1229	578	2319	49%	47%

[8] Note that the aggregate patent counts on this index will not match the totals on the overall Patent Index because the Patents Index includes all patents, both assigned and not assigned. This index only considers assigned patents which are a subset of the total. Ranking for this Index is based on a combined measure. First, the percentage is measured of assignees that are co-local to the inventor. Then the same is done relative to patent counts. Then, based on each of these measures (assignees and patents), each metro region is placed within the standard deviation, or above and below it. These are then combined and the metros are ranked so that those metros that are above the standard deviation in both measures are highest (then sorted by assignees, then patents, when necessary to break ties). Then those metros that are within one standard deviation. Then those that are below one standard deviation.

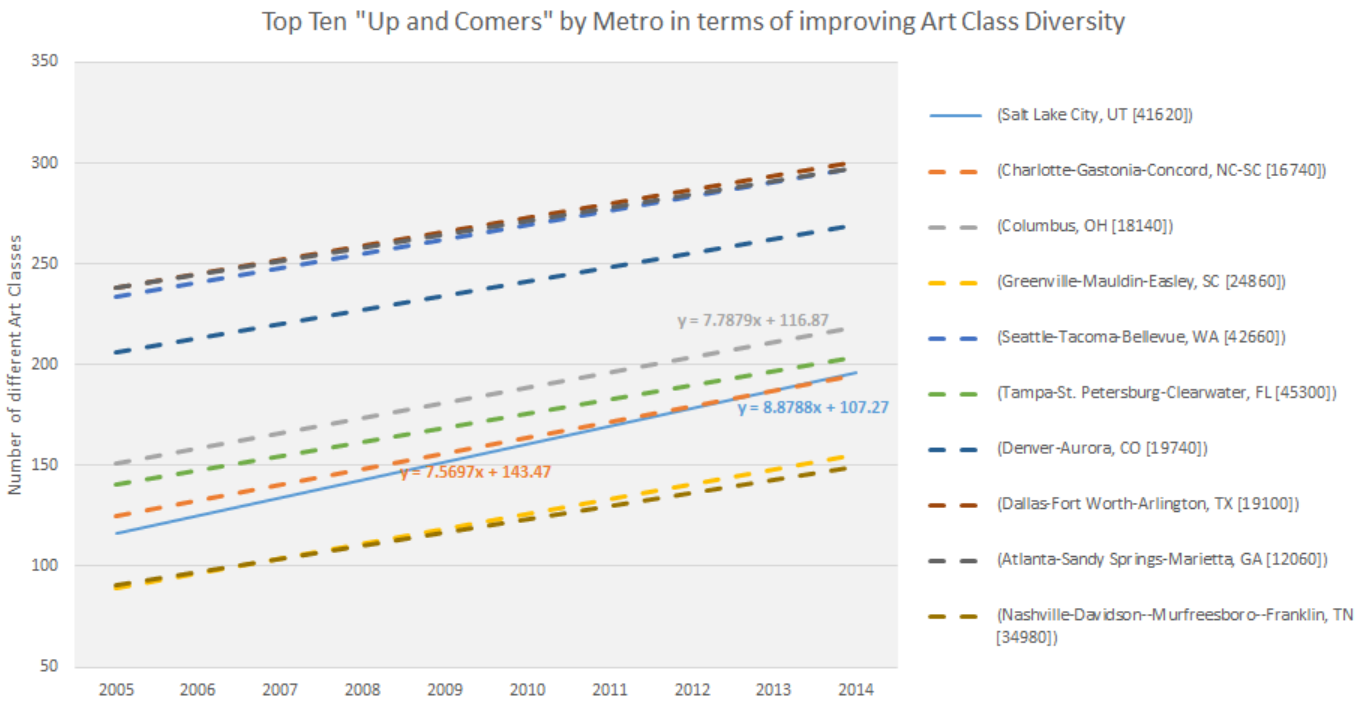
NEW COMPANY INDEX[9]:

Rank	Metro Region	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
1	New York-Northern New Jersey-Long Island, NY-NJ-PA [35620]	1041	758	587	541	492	585	512	571	620	660	6367
2	San Jose-Sunnyvale-Santa Clara, CA [41940]	943	586	409	401	340	411	375	383	435	443	4726
3	San Francisco-Oakland-Fremont, CA [41860]	707	514	335	316	330	417	372	393	503	537	4424
4	Boston-Cambridge-Quincy, MA-NH [14460]	695	488	346	320	262	329	324	341	414	345	3864
5	Chicago-Naperville-Joliet, IL-IN-WI [16980]	627	419	305	256	233	258	255	278	291	286	3208
6	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	451	314	241	225	225	236	350	322	300	300	2964
7	San Diego-Carlsbad-San Marcos, CA [41740]	381	240	198	163	170	228	207	228	226	244	2285
8	Washington-Arlington-Alexandria, DC-VA-MD-WV [47900]	265	229	189	149	145	193	183	178	220	222	1973
9	Dallas-Fort Worth-Arlington, TX [19100]	284	236	170	144	141	188	174	186	185	222	1930
10	Houston-Sugar Land-Baytown, TX [26420]	265	209	175	144	119	178	157	153	204	211	1815
11	Atlanta-Sandy Springs-Marietta, GA [12060]	252	185	156	133	132	130	159	139	160	168	1614
12	Seattle-Tacoma-Bellevue, WA [42660]	245	168	134	133	102	146	143	164	173	173	1581
13	Detroit-Warren-Livonia, MI [19820]	268	198	122	108	96	155	110	115	138	137	1447
14	Denver-Aurora, CO [19740]	202	142	127	113	80	122	114	145	136	157	1338
15	Miami-Fort Lauderdale-Pompano Beach, FL [33100]	169	138	98	85	113	124	130	124	150	178	1309
16	Minneapolis-St. Paul-Bloomington, MN-WI [33460]	230	158	135	111	83	115	100	104	110	118	1264
17	Phoenix-Mesa-Scottsdale, AZ [38060]	185	135	117	106	78	109	104	136	126	132	1228
18	Cleveland-Elyria-Mentor, OH [17460]	196	131	93	73	84	97	84	81	96	71	1006
19	Portland-Vancouver-Beaverton, OR-WA [38900]	149	98	107	72	84	83	81	83	83	106	946
20	Austin-Round Rock, TX [12420]	132	107	65	50	75	89	86	86	92	121	903
21	Boulder, CO [14500]	140	83	67	69	64	80	73	85	86	105	852
22	Cincinnati-Middletown, OH-KY-IN [17140]	132	125	66	82	67	85	63	67	65	73	825
23	Bridgeport-Stamford-Norwalk, CT [14860]	153	101	68	42	60	51	58	55	49	66	703
24	Las Vegas-Paradise, NV [29820]	84	72	67	55	44	52	75	68	85	89	691
25	Oxnard-Thousand Oaks-Ventura, CA [37100]	118	72	66	56	46	61	50	63	50	76	658

[9] The New Companies Index examines patent assignee names each year looking for that name in any of the prior years. The name is only counted the first time it is seen. This Index, strictly speaking, cannot know that these are actually new companies. What it does show is the first time that company has been awarded a patent during the target ten year period – which _may_ be an indicator of a new company formed around one or more patents.

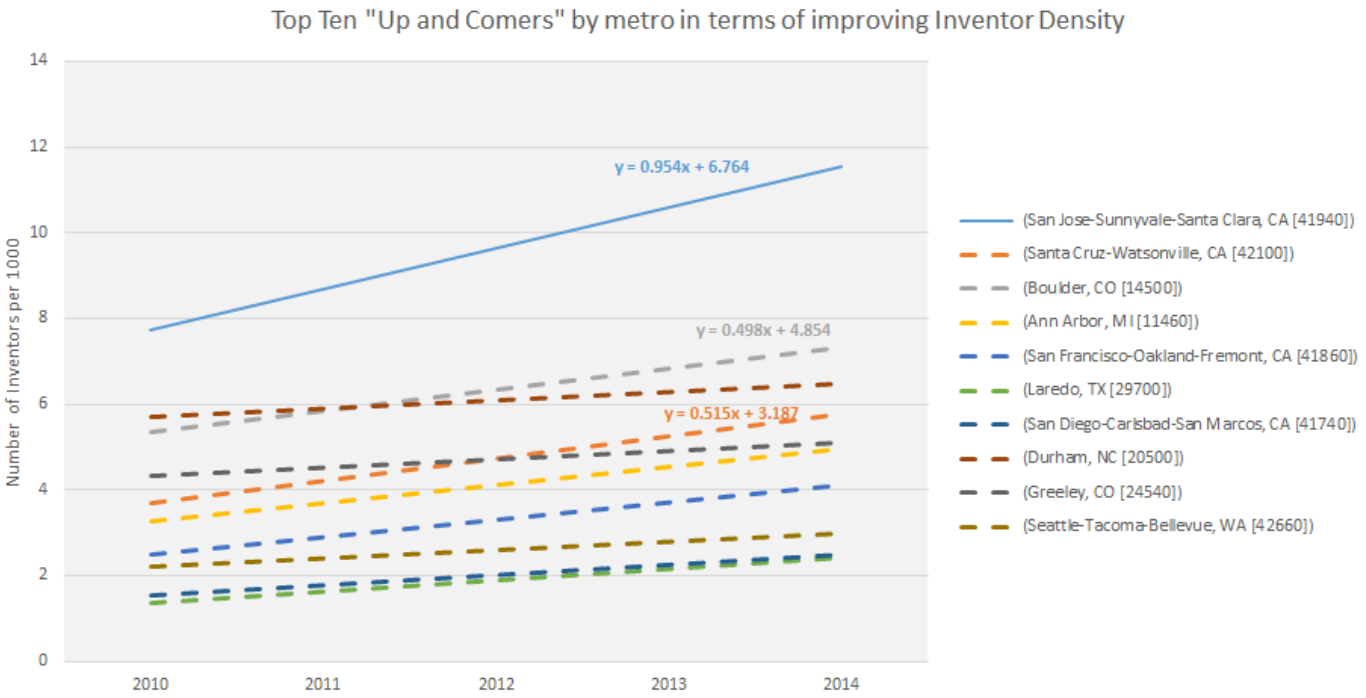
UP & COMING INDEX:

TRENDING PATENT CLASS DIVERSITY:



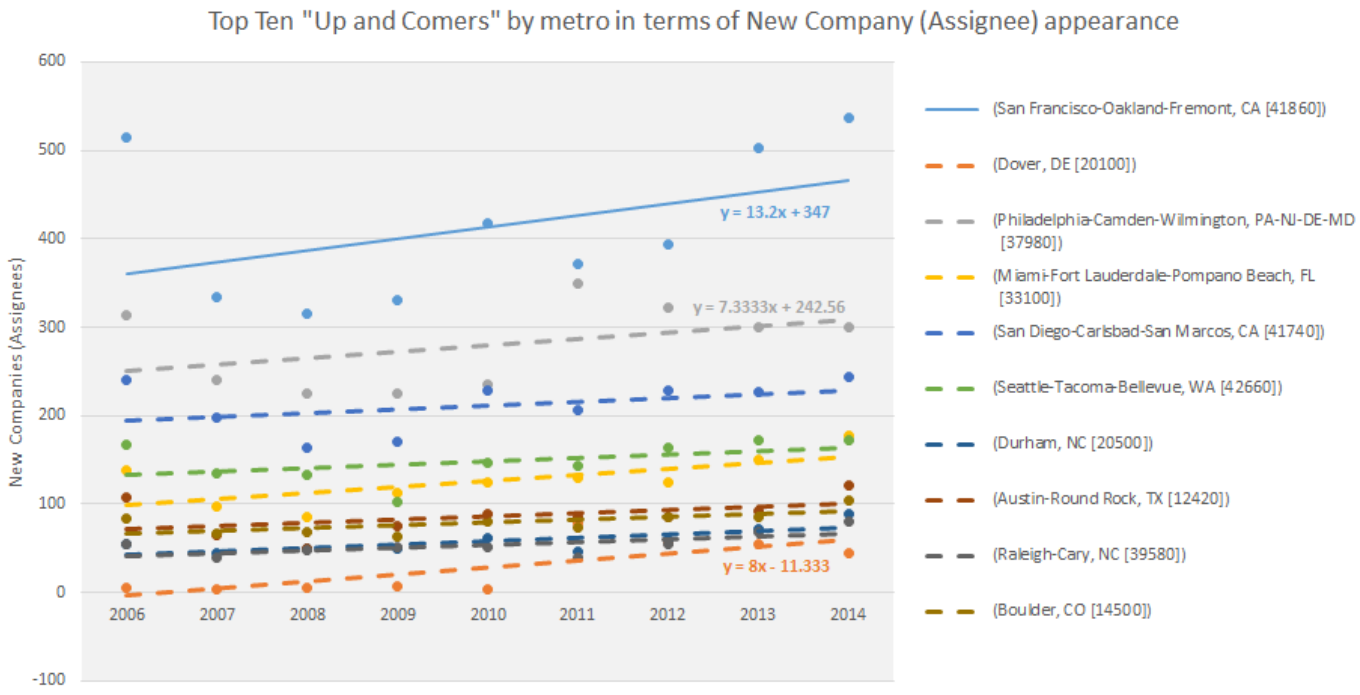
Rank	Metro Region	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Trend
1	Salt Lake City, UT [41620]	120	134	134	134	145	158	165	184	178	209	8.88
2	Charlotte-Gastonia-Concord, NC-SC [16740]	118	157	140	130	141	175	178	169	189	200	7.79
3	Columbus, OH [18140]	155	175	165	165	172	178	183	213	218	227	7.57
4	Greenville-Mauldin-Easley, SC [24860]	101	107	110	101	96	114	124	153	150	168	7.31
5	Seattle-Tacoma-Bellevue, WA [42660]	238	261	230	240	254	282	275	289	302	289	7.12
6	Tampa-St. Petersburg-Clearwater, FL [45300]	144	160	154	149	152	172	192	198	192	207	7.03
7	Denver-Aurora, CO [19740]	224	226	211	210	210	236	258	259	271	272	7.01
8	Dallas-Fort Worth-Arlington, TX [19100]	252	258	246	235	250	277	280	288	309	299	6.98
9	Atlanta-Sandy Springs-Marietta, GA [12060]	250	267	243	234	240	277	276	285	303	302	6.62
10	Nashville-Davidson--Murfreesboro--Franklin, TN [34980]	96	101	96	107	104	133	143	125	150	146	6.52

TRENDING INVENTOR DENSITY:



			Inventors per 1000					Annualized Change		
Rank	Metro Region	Est 2014 Population	2010	2011	2012	2013	2014	Population	Inventors	Trend
1	San Jose-Sunnyvale-Santa Clara, CA [41940]	1952872	8.35	8.43	8.83	10.37	12.15	29034	2098	0.954
2	Santa Cruz-Watsonville, CA [42100]	271804	3.95	4.11	4.37	5.3	5.93	2336	149	0.515
3	Boulder, CO [14500]	313333	5.81	5.59	5.78	6.93	7.63	4727	183	0.498
4	Ann Arbor, MI [11460]	356874	3.48	3.39	4.06	4.64	4.99	2943	162	0.427
5	San Francisco-Oakland-Fremont, CA [41860]	4594060	2.74	2.77	3.05	3.68	4.28	64681	2008	0.399
6	Laredo, TX [29700]	266673	1.41	1.54	1.9	2.15	2.46	4089	78	0.271
7	San Diego-Carlsbad-San Marcos, CA [41740]	3263431	1.62	1.69	1.93	2.29	2.52	41702	844	0.24
8	Durham, NC [20500]	542710	5.82	6.03	5.77	6.17	6.73	9450	161	0.196
9	Greeley, CO [24540]	277670	4.6	4.38	4.33	4.9	5.31	6151	81	0.194
10	Seattle-Tacoma-Bellevue, WA [42660]	3671478	2.43	2.27	2.46	2.73	3.17	57893	853	0.194

TRENDING NEW COMPANY CREATION[10]:



Rank	Metro Region	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Trend
1	San Francisco-Oakland-Fremont, CA [41860]	707	514	335	316	330	417	372	393	503	537	13.2
2	Dover, DE [20100]	9	5	4	6	7	3	78	56	55	44	8
3	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD [37980]	451	314	241	225	225	236	350	322	300	300	7.333
4	Miami-Fort Lauderdale-Pompano Beach, FL [33100]	169	138	98	85	113	124	130	124	150	178	6.85
5	San Diego-Carlsbad-San Marcos, CA [41740]	381	240	198	163	170	228	207	228	226	244	4.45
6	Seattle-Tacoma-Bellevue, WA [42660]	245	168	134	133	102	146	143	164	173	173	4
7	Durham, NC [20500]	104	55	45	49	49	61	47	60	71	88	3.833
8	Austin-Round Rock, TX [12420]	132	107	65	50	75	89	86	86	92	121	3.667
9	Raleigh-Cary, NC [39580]	96	55	39	48	52	52	40	54	69	80	3.167
10	Boulder, CO [14500]	140	83	67	69	64	80	73	85	86	105	3.1

[10] The trend calculation for this Index does not include the year 2005. This is because this study doesn't include prior years so there is no way to know which companies (assignees) in 2005 were seen for the first time.

COMPOSITE UP & COMING INDEX[11]:

		Individual Rankings					
Rank	Metro Region	Inventors	Patents	Diversity	Density	New Cos	Tot Score
1	Seattle-Tacoma-Bellevue, WA [42660]	3	5	5	10	6	21
2	Durham, NC [20500]	12	11	28	8	7	43
3	San Diego-Carlsbad-San Marcos, CA [41740]	6	6	36	7	5	48
4	Denver-Aurora, CO [19740]	17	18	7	34	12	53
5	San Francisco-Oakland-Fremont, CA [41860]	2	2	55	5	1	61
6	Boulder, CO [14500]	22	23	49	3	10	62
7	Salt Lake City, UT [41620]	33	36	1	44	17	62
8	Santa Cruz-Watsonville, CA [42100]	24	20	25	2	35	62
9	Raleigh-Cary, NC [39580]	15	15	19	39	9	67
10	Hartford-West Hartford-East Hartford, CT [25540]	29	31	13	22	37	72
11	Provo-Orem, UT [39340]	45	48	24	35	18	77
12	Houston-Sugar Land-Baytown, TX [26420]	8	9	15	64	15	94
13	Laredo, TX [29700]	44	56	47	6	41	94
14	Indianapolis-Carmel, IN [26900]	26	28	30	54	22	106
15	Greeley, CO [24540]	67	53	89	9	11	109
16	Iowa City, IA [26980]	73	68	62	21	32	115
17	Austin-Round Rock, TX [12420]	9	8	20	91	8	119
18	Charlotte-Gastonia-Concord, NC-SC [16740]	28	39	2	69	52	123
19	Dallas-Fort Worth-Arlington, TX [19100]	14	10	8	99	19	126
20	Greenville-Mauldin-Easley, SC [24860]	42	47	4	27	99	130
21	Port St. Lucie, FL [38940]	100	76	22	83	30	135
22	Palm Bay-Melbourne-Titusville, FL [37340]	65	63	82	20	45	147
23	Cedar Rapids, IA [16300]	72	70	75	16	60	151
24	Blacksburg-Christiansburg-Radford, VA [13980]	119	113	45	25	86	156
25	Bloomington, IN [14020]	78	77	39	19	100	158

[11] This Index tracks trends. The Inventors and Patents rankings are NOT counted in the total overall Up & Coming rank because these are more relevantly captured in the Inventor Density ranking. They are provided here for reference only. The three rankings that count toward the overall Up & Coming rank are: Class Diversity (a measure of increase or decrease in variety of talent), Inventor Density (inventors are increasing or decreasing relative to general population – thus becoming more or less inventive) and New Companies (new company assignees are growing or shrinking as a measure of whether invention is manifesting in new startups or not).

"BONUS" RANKINGS:

PATENT CLASS "CONCENTRATION" INDEX:

Rank	Metro Region	Dominant Art Class	% of all Patents
1	Hickory-Lenoir-Morganton, NC [25860]	Optical waveguides [385]	63.0%
2	Harrisburg-Carlisle, PA [25420]	Electrical connectors [439]	62.9%
3	Reno-Sparks, NV [39900]	Amusement devices: games [463]	61.1%
4	Houma-Bayou Cane-Thibodaux, LA [26380]	Wells [166]	56.6%
5	Des Moines-West Des Moines, IA [19780]	Multicellular living organisms and unmodified parts thereof and related processes [800]	55.8%
6	Canton-Massillon, OH [15940]	Registers [235]	50.2%
7	Lafayette, LA [29180]	Wells [166]	45.8%
8	Las Vegas-Paradise, NV [29820]	Amusement devices: games [463]	44.4%
9	Salisbury, MD [41540]	Animal husbandry [119]	40.5%
10	El Centro, CA [20940]	Dynamic information storage or retrieval [369]	38.5%
11	York-Hanover, PA [49620]	Electrical connectors [439]	37.8%
12	Vineland-Millville-Bridgeton, NJ [47220]	Registers [235]	36.5%
13	Myrtle Beach-Conway-North Myrtle Beach, SC [34820]	Electricity: electrical systems and devices [361]	35.7%
14	Albany, GA [10500]	Multicellular living organisms and unmodified parts thereof and related processes [800]	35.6%
15	Atlantic City, NJ [12100]	Registers [235]	34.1%
16	Lincoln, NE [30700]	Optics: measuring and testing [356]	33.4%
17	Abilene, TX [10180]	Data processing: financial, business practice, management, or cost/price determination [705]	33.3%
18	Midland, TX [33260]	Wells [166]	30.6%
19	Memphis, TN-MS-AR [32820]	Surgery [606]	29.8%
20	Ocala, FL [36100]	Multiplex communications [370]	29.4%
21	Norwich-New London, CT [35980]	Drug, bio-affecting and body treating compositions [514]	29.0%
22	Wilmington, NC [48900]	Induced nuclear reactions: processes, systems, and elements [376]	28.8%
23	Charleston, WV [16620]	Synthetic resins or natural rubbers -- part of the class 520 series [526]	28.0%
24	Springfield, IL [44100]	Multicellular living organisms and unmodified parts thereof and related processes [800]	27.7%
25	Jacksonville, NC [27340]	Cleaning compositions for solid surfaces, auxiliary compositions therefor, or processes of preparing the compositions [510]	26.3%

PATENT CLASS – SHARED INVENTOR & ASSIGNEE LOCALITY INDEX:

Rank	Art Class	Assignee Locations	Inventor Locations	Shared Assignee-Inventor Locations	Shared Percentage
1	Compound tools [7]	2	2	2	100.0%
2	Boot and shoe making [12]	3	2	2	100.0%
3	Wood turning [142]	3	3	3	100.0%
4	Communications: electrical [340]	190	240	189	78.8%
5	Chemistry: molecular biology and microbiology [435]	174	220	173	78.6%
6	Drug, bio-affecting and body treating compositions [424]	182	230	180	78.3%
7	Liquid purification or separation [210]	174	218	168	77.1%
8	Data processing: financial, business practice, management, or cost/price determination [705]	183	235	181	77.0%
9	Data processing: measuring, calibrating, or testing [702]	173	220	169	76.8%
10	Stock material or miscellaneous articles [428]	170	225	170	75.6%
11	Typesetting [276]	3	4	3	75.0%
12	Electric heating [219]	146	186	138	74.2%
13	Drug, bio-affecting and body treating compositions [514]	171	229	169	73.8%
14	Chemical apparatus and process disinfecting, deodorizing, preserving, or sterilizing [422]	155	206	151	73.3%
15	Electricity: measuring and testing [324]	155	208	152	73.1%
16	Food or edible material: processes, compositions, and products [426]	133	181	132	72.9%
17	Surgery [606]	165	224	163	72.8%
18	Radiant energy [250]	148	200	145	72.5%
19	Image analysis [382]	148	198	143	72.2%
20	Optics: measuring and testing [356]	146	196	141	71.9%
21	Measuring and testing [73]	137	188	135	71.8%
22	Plastic and nonmetallic article shaping or treating: processes [264]	153	211	151	71.6%
23	Surgery [600]	157	216	154	71.3%
24	Data processing: generic control systems or specific applications [700]	153	212	151	71.2%
25	Organic compounds -- part of the class 532-570 series [534]	104	141	100	70.9%

TOP 100 UNIVERSITIES:

Rank	Higher Education Institution	Patents
1	University of California	4237
2	Massachusetts Institute of Technology	2168
3	Leland Stanford Junior University (Stanford Univ)	1642
4	University of Texas	1473
5	California Institute of Technology	1412
6	University of Michigan	1026
7	Johns Hopkins University	988

8	University of Florida	925
9	Columbia University in the City of New York	827
10	University of Illinois	825
11	University of Pennsylvania	721
12	University of South Florida	696
13	University of Washington	680
14	Harvard College	648
15	University of Southern California	610
16	University of Maryland	595
17	Northwestern University	570
18	University of Central Florida	568
19	State University of New York	562
20	University of Utah	519
21	Duke University	506
22	New York University	495
23	University of Massachusetts	477
24	University of Minnesota	466
25	University of North Carolina	426
26	University of Pittsburgh	424
27	Penn State [University] Research Foundation	407
28	Rutgers The State University of New Jersey	401
29	North Carolina State University	388
30	Michigan State University	386
31	Ohio State University	374
32	Princeton University	335
33	University of Colorado	327
34	University of Rochester	320
35	Yale University	317
36	Vanderbilt University	308
37	Rice University	307
38	University of Arkansas	293
39	Texas A&M University	289
40	Cornell University	276
41	University of Georgia	274
42	University of Iowa	274
43	University of Kentucky	272
44	Carnegie Mellon University	271
45	University of Missouri	271
46	Washington University	269
47	Iowa Research The University Foundation	254
48	University of Connecticut	254
49	Case Western Reserve University	252
50	University of Virginia	240
51	Arizona State University	235

52	University of Chicago	224
53	University of Tennessee Research Foundation	222
54	Dartmouth College	220
55	Emory University	218
56	Drexel University	198
57	Rensselaer Polytechnic Institute	191
58	Rockefeller University	187
59	Louisiana State University & Agricultural & Mechanical College	184
60	Tufts University	180
61	University of Oklahoma	176
62	New Jersey Institute of Technology	175
63	Auburn University	171
64	University of Nebraska	171
65	Oregon Health and Science University	169
66	University of Arizona	167
67	Boston University	166
68	Baylor College of Medicine	159
69	Brigham Young University	153
70	Indian University Research and Technology Corporation	153
71	University of South Carolina	151
72	Wake Forest University	149
73	University of Kansas	146
74	University of Akron	143
75	Albert Einstein College of Medicine of Yeshiva University	142
76	University of Houston	140
77	University of Louisville	140
78	Wayne State University	137
79	University of Delaware	135
80	Clemson University	134
81	University of Medicine & Dentistry of New Jersey	130
82	Washington State University	126
83	Georgetown University	124
84	University of Cincinnati	115
85	Colorado State University Research Foundation	113
86	University of Oregon	109
87	Polytechnic Institute of New York University	108
88	Brown University	107
89	University of Notre Dame	107
90	Loma Linda University	104
91	University of Miami	98
92	Northeastern University	97
93	University of Wyoming	94
94	Kent State University	92
95	Utah State University	92

96	University of Alabama	89
97	University of Nevada	89
98	University of Toledo	85
99	Virginia Commonwealth University	85
100	Syracuse University	84

METHODS AND SOURCES

Compiling the Inventiveness Index was an organic process of discovery, analysis, synthesis and refinement. Three corpuses of data were merged: Patents, Census/Demographic and IRS/Economic. A structure that mapped city/state to CBSA (Core Based Statistical Areas) was used to link these datasets.

It began with downloading a single file of patent data via Google's bulk download webpage: https://www.google.com/googlebooks/uspto-patents-grants-text.html which Google eventually, and inexplicably (despite numerous inquiries on my part), ceased to update after 17-March-2015. These same bulk loading files are also available via agreement of the PTO and Reed Technologies here: http://patents.reedtech.com/patent-products.php which are currently up to date.

The PTO data files are in XML format and, to be generous, are not always structurally sound and data hygiene scores a 7 out of 10. These weekly files are published every Tues. These XML files had to be transformed into a structure that could be imported into a SQL database for query and analysis. This was not straightforward, but nothing that a couple thousand custom lines of Python code couldn't handle. ☺

Collectively, 571 patent files (to date) across ten plus years and four DTD formats were downloaded and imported ranging from 240MB to 700MB per XML file. The resulting database (now current as of this writing in mid-December 2015) includes over 2.5M patents.

The patent data includes the city, state and country of the inventor, the applicant (typically the same as the inventor), the assignee (owner of the patent) as well as the agent (attorney) who helped prepare and prosecute the patent application. However, it wasn't reasonable to analyze and summarize patent data for each and every one of the 38,000 to 56,000 individual communities (depending on how you counted them) across the nation. Some level of regional rollup was required.

This problem was resolved by downloading several other data sets and importing them to the same database as the patents.

Several sources were required for solving this problem. These included:

- The US Census Bureau's FactFinder website: http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk (downloading the 4+GB file: CB1200CZ21.dat) which translates towns to CBSA (Core-Based Statistical Areas), see: https://www.census.gov/geo/reference/gtc/gtc_cbsa.html
- The US Census Bureau's site: http://www.census.gov/geo/ZCTA/zcta.html (which now appears to have been taken down) for the 400MB file: zip07_cbsa06.txt which contains ZIP codes translated to towns.
- IRS Website Data Download [https://www.irs.gov/uac/SOI-Tax-Stats-Individual-Income-Tax-Statistics-2013-ZIP-Code-Data-%28SOI%29].

I developed a chain of linkages that connected Inventor or Assignee city/state to their host CBSA and then did the data rollups at the CBSA level.

