Utilizing
"Big Data"
to Generate Alpha in Portfolios of Consumer Equities

For additional information please visit:

BrandLoyalties.com/QWAFAFEW

Or contact:

Tony@BrandLoyalties.com

Over the past few years

"Big Data"

refers to the vast amounts of data generated
– consciously or unconsciously –
by billions of people every day

when they leave **digital tracks** as they simply go about their plugged-in life during the 21st century.

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Who uses the **"Big Data"** that people leave behind?

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When doing whatever it is that they do ...

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Business "Big Data" comes from billions of on-line:

- Product or merchant searches
- Price comparisons / discount hunting
- Product reviews and recommendations (Yelp)
- Store location and/or business hours queries
- Auction entries or bids, on-line ads
- Help, Travel, Hobby and Investment forums
- Social media postings, "Likes" and "Tweets"
- "Siri: Where is the nearest Starbucks?"
- … Anything that leaves behind digital tracks

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Business "Big Data" comes from billions of on-line:

- Product or merchant searches
- Price comparisons / discount hunting

This "Big Data" is typically massaged every day
by corporate product managers and marketing analysts.

- "Siri: Where is the nearest Starbucks?"
- … Anything that leaves behind digital tracks

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Our topic here:

Turning "Big Data" derived

Business Intelligence

Into

Investment Alpha

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Turning "Big Data" into Investment α:

Let's examine several simple questions:

- Are a corporation's customers ultimately responsible for corporate revenue?
- Are there recent corporate revenues that have not become public knowledge yet?
- Would it be a good thing to know about corporate revenues before they become public knowledge?
- Can "Big Data" tell us what a corporation's customers were buying recently (e.g. yesterday)?

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Turning "Big Data" into Investment α:

Peter Lynch famously exploited the **consumer link to revenues** while managing the Magellan Fund at Fidelity Investments during 1977-1990

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Turning "Big Data" into Investment α:

– when the average annual return experienced by Magellan's shareholders was over 29%.

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Turning "Big Data" into Investment α:

One of Peter's key initial equity screens involved selecting only those companies that he knew were selling products again and again to his acquaintances.

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Turning "Big Data" into Investment α:

How can we utilize "Big Data" to update Peter Lynch's approach for the early 21st Century?

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What **Raw** information is in **"Big Data"**?

- Brand Names – (e.g., iPhone, iPad, iTunes & Mac)
  - Raw Brand "Citation" Rates
  - Opinions ("Likes" and "Unlikes")
- Corporate Names – (e.g., AAPL & Apple, Inc.)
  - Raw Citation Rates
  - Perceptions / Sentiment

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What can be **Deduced** from **"Big Data"**?

- Current popularity of various brand names
  - Seasonally adjusted "citation" rates
  - Peer relative rankings provide market share data
- Changes in citation rates over time
  - YOY changes during given quarters anticipate revenue surprises
- Alerts to developing product or service "events"
  - Statistically significant short term citation "blips"
- Brand -> Revenue relationships
  - Including some that are not otherwise publicly available

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Is **"Big Data"** really useful?

- At any given time roughly 40% of cited corporations have trailing 8 quarter revenue strongly correlated to citation rates – typically corporations with principal operations in the consumer sector and which embrace on-line marketing & sales of discretionary goods
- Examples of corporations with recent 90% citation -> revenue correlation include:
  - FRAN – Francesca's Holdings Corp.
  - JCP – J.C. Penney Co., Inc.
  - LUV – Southwest Airlines Co.
  - IBKR – Interactive Brokers Group, Inc.
  - JWN – Nordstrom, Inc.

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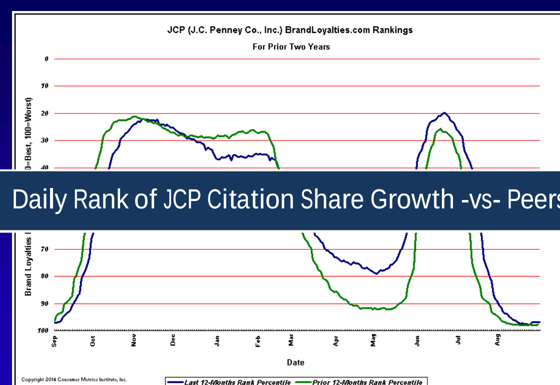

Daily Rank of JCP Citation Share Growth -vs- Peers

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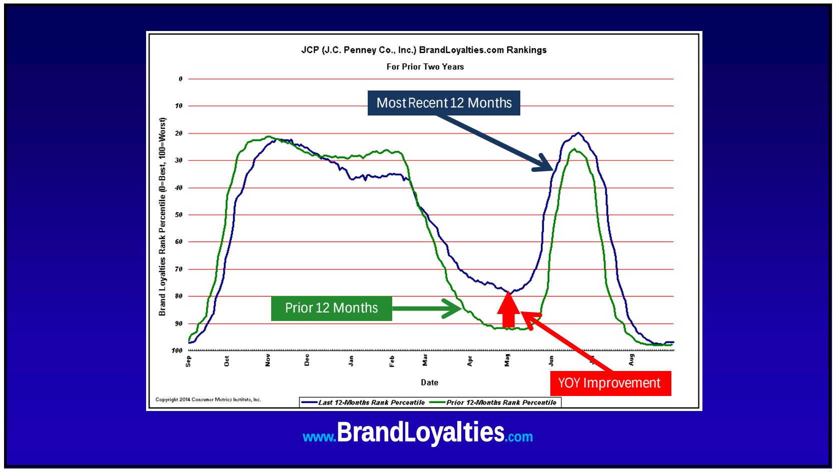
JCP (J.C. Penney Co., Inc.) BrandLoyalties.com Rankings
For Prior Two Years
Most Recent 12 Months
Prior 12 Months
YOY Improvement
Date
Brand Loyalties Rank Percentile (0=Best, 100=Worst)
Last 12-Months Rank Percentile
Prior 12-Months Rank Percentile
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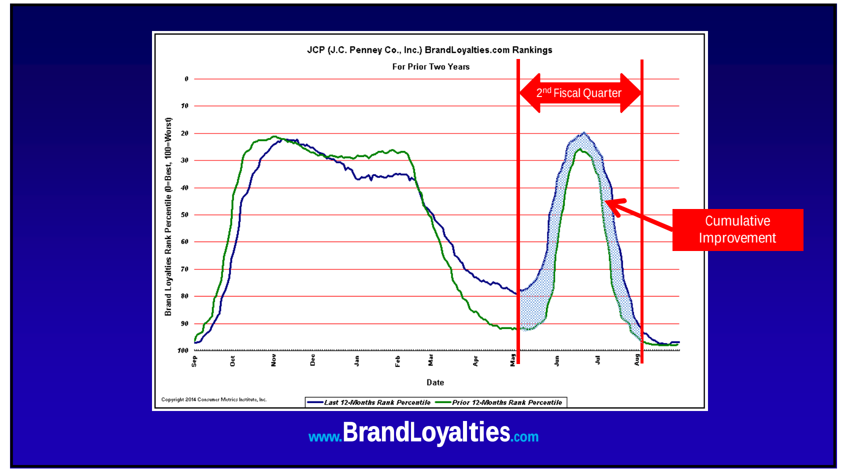
JCP (J.C. Penney Co., Inc.) BrandLoyalties.com Rankings
For Prior Two Years
2nd Fiscal Quarter
Cumulative Improvement
Date
Brand Loyalties Rank Percentile (0=Best, 100=Worst)
Last 12-Months Rank Percentile
Prior 12-Months Rank Percentile
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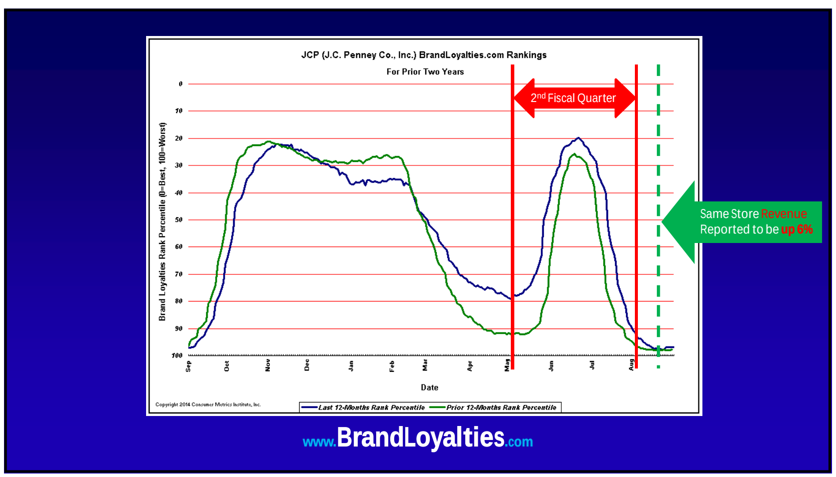
JCP (J.C. Penney Co., Inc.) BrandLoyalties.com Rankings
For Prior Two Years
2nd Fiscal Quarter
Same Store Revenue Reported to be up 6%
Date
Brand Loyalties Rank Percentile (0=Best, 100=Worst)
Last 12-Months Rank Percentile
Prior 12-Months Rank Percentile
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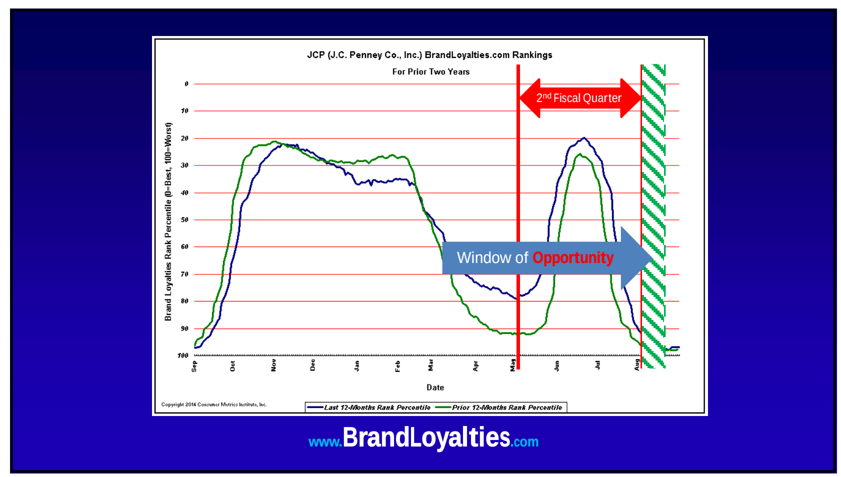
JCP (J.C. Penney Co., Inc.) BrandLoyalties.com Rankings
For Prior Two Years
2nd Fiscal Quarter
Window of Opportunity
Date
Brand Loyalties Rank Percentile (0=Best, 100=Worst)
Last 12-Months Rank Percentile
Prior 12-Months Rank Percentile
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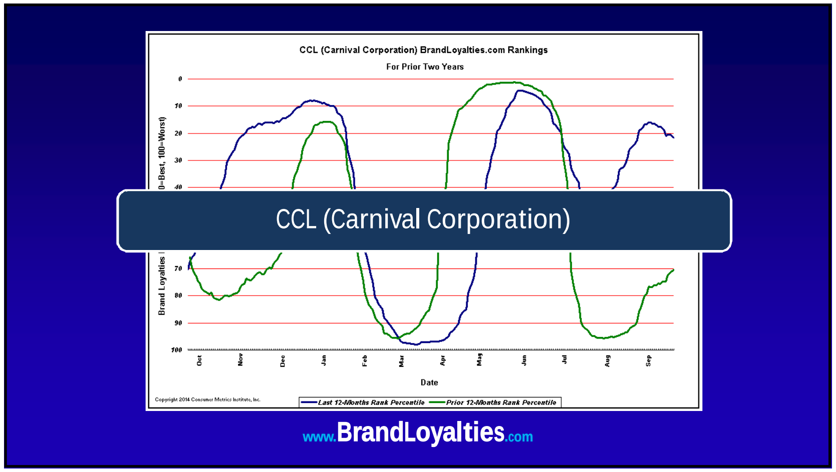
CCL (Carnival Corporation) BrandLoyalties.com Rankings
For Prior Two Years
CCL (Carnival Corporation)
Date
Last 12-Months Rank Percentile
Prior 12-Months Rank Percentile
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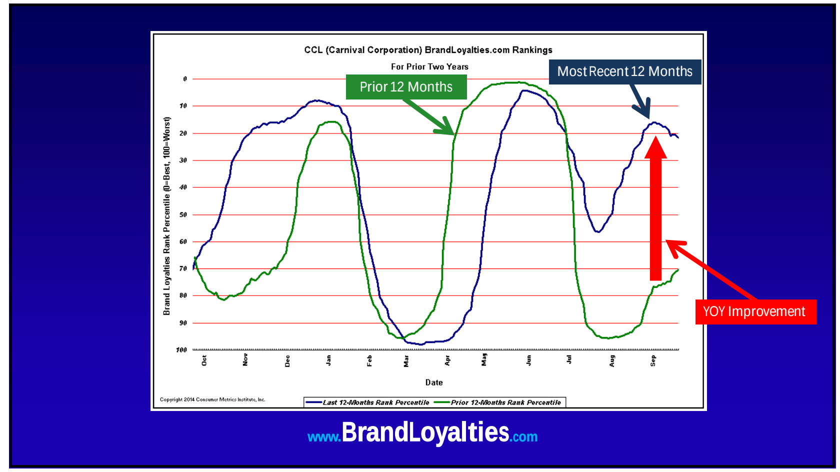
CCL (Carnival Corporation) BrandLoyalties.com Rankings
For Prior Two Years
Most Recent 12 Months
Prior 12 Months
YOY Improvement
Brand Loyalties Rank Percentile (0=Best, 100=Worst)
Date
Last 12-Months Rank Percentile
Prior 12-Months Rank Percentile
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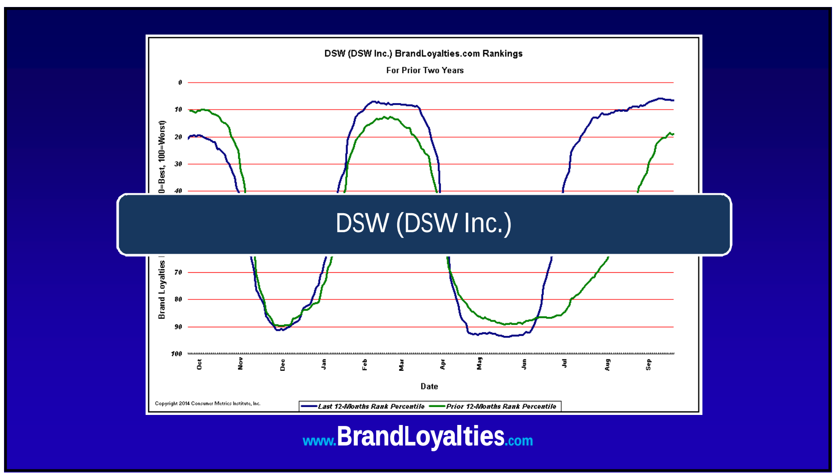
DSW (DSW Inc.) BrandLoyalties.com Rankings
For Prior Two Years
DSW (DSW Inc.)
Date
Last 12-Months Rank Percentile
Prior 12-Months Rank Percentile
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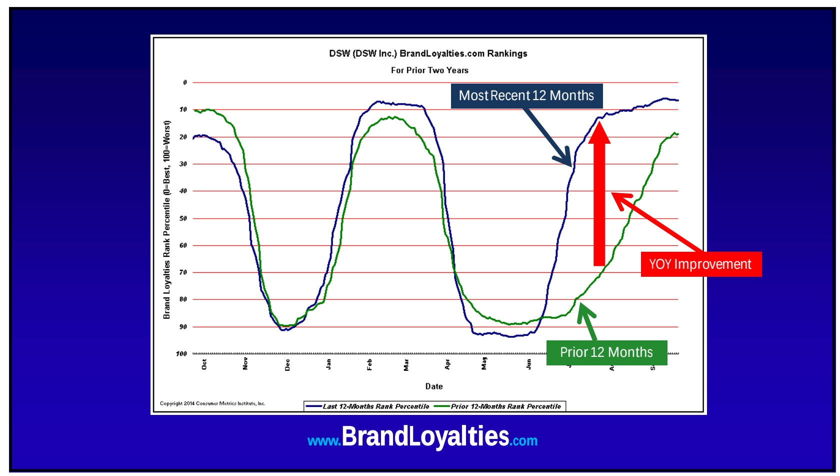
DSW (DSW Inc.) BrandLoyalties.com Rankings
For Prior Two Years
Most Recent 12 Months
YOY Improvement
Prior 12 Months
Brand Loyalties Rank Percentile (0=Best, 100=Worst)
Date
Last 12-Months Rank Percentile
Prior 12-Months Rank Percentile
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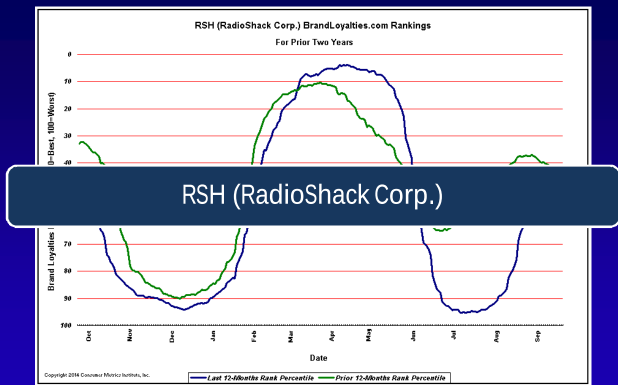

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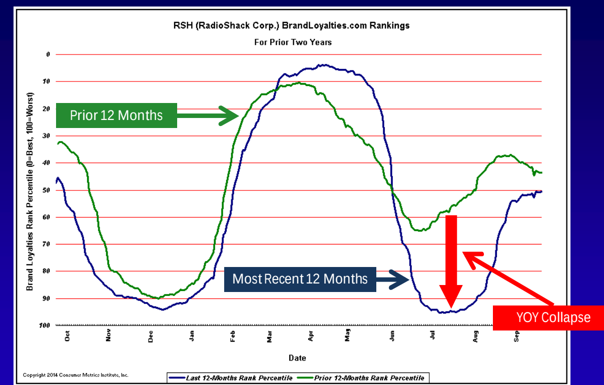

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Is "Big Data" really useful?

- Conversely, at any given time roughly 60% of all corporations don't have trailing 8 quarter revenue that correlates well to citation rates.
- Examples of corporations that do not have high citation -> revenue correlations include:
  - LMT – Lockheed Martin Corporation
  - XOM – Exxon Mobil Corporation
  - MON – Monsanto Co.
  - RY – Royal Bank Of Canada
  - DD – E. I. du Pont de Nemours and Company

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Does "Big Data" work for Medium/Small Caps?

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"Big Data" and Capitalization:

- Usefulness is theoretically independent of scale of capitalization

AMGN to JACK capitalization ratio: 43:1

AMGN to JACK citation rate ratio: 1:59

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"Big Data" and Capitalization:

- Usefulness is theoretically independent of scale of capitalization

MCD to JACK capitalization ratio: 38:1

MCD to JACK citation share ratio: 29:1

etail

tios

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"Big Data" and Capitalization:

- Usefulness is theoretically independent of scale of capitalization
  - In principle methods are cap agnostic
  - The industry and scale of consumer operations are the critical factors

retail

atios

Citation rate -> Revenue correlations are strongest for retailers of discretionary durable goods

  - Current citation rates
  - YOY citation growth rate
  - Citation rate -> revenue correlation

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"Big Data" and Capitalization:

- Usefulness is theoretically independent of scale of capitalization
  - In principle methods are cap agnostic
  - The industry and scale of consumer operations are the critical factors
  - However, size matters: larger cap corporations with national markets and retail facilities generally have higher raw citation rates and better signal/noise ratios
- Most important metrics are:
  - Current citation rates
  - YOY citation growth rate
  - Citation rate -> revenue correlation
  - Citation rate -> earnings / equity price correlation
    - Quantify the citation rate -> revenue -> earnings -> equity price causality chain

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"Big Data" key criteria:

- Signal "Luminosity"
  - Baseline customer commerce brand name citations
  - "Event" generated citations:
    - Product/Service nightmares (recalls, outages, operational disasters)
    - Corporate nightmares (scandals, M&A, layoffs, fiscal implosions)
- Signal "Relevance"
  - Citations -> Revenue correlations
  - Citations -> Revenue -> Earnings -> Equity Price causality chain

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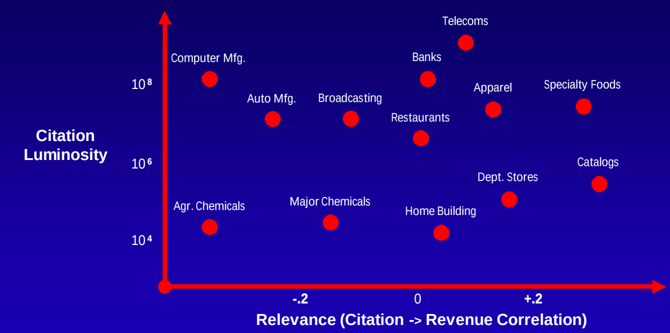
Luminosity and Relevance by Industry:



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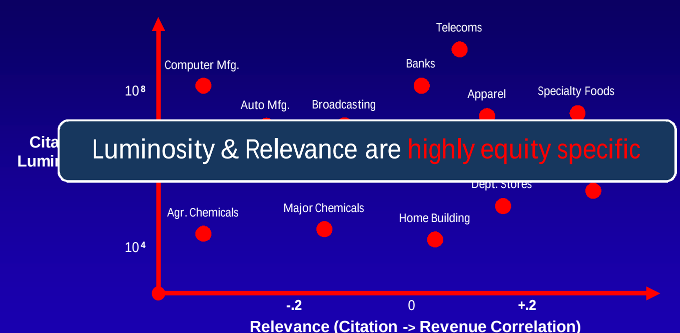
Luminosity and Relevance by Industry:



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Luminosity and Relevance by Industry:

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The “Big” question: can

“Big Data”

actually be used in the real world
to **significantly** and **consistently** augment

Alpha?

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“Big Data” and Alpha:

- Hypothesis: Certain **“Big Data”** metrics might provide portfolio **Alpha**
  - Recent normalized citation share growth rate (ranked –vs– peers)
  - YOY change in trailing quarter citation share growth
  - Citation rate -> revenue correlation
  - Integrity of citation rate **->** revenue **->** earnings **->** equity price causality chain

Hypothesis: 4 different **“Big Data”** derived metrics **plausibly** could provide α.

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“Big Data” and Alpha:

- Hypothesis: Certain **“Big Data”** metrics might provide portfolio **Alpha**
  - Recent normalized citation share growth rate (ranked –vs– peers)
  - YOY change in trailing quarter citation share growth
  - Citation rate -> revenue correlation
  - Integrity of citation rate -> revenue -> earnings -> equity price causality chain
- Test: Using hypothetical / pro-forma model portfolios
  - Construct “proof of concept” portfolios to identify potential alpha
  - Compose portfolios blindly using above metrics
  - Select best rated 10% at any time
  - Rebalance portfolios when composition changes
  - Calculate returns using:
    - Cumulative compound annualized return for full time span

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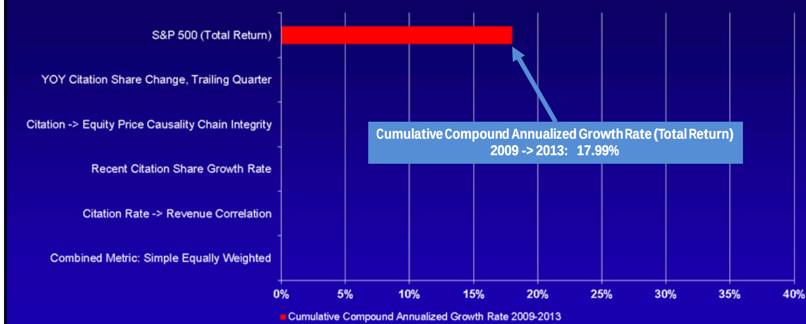
“Big Data” and Alpha:



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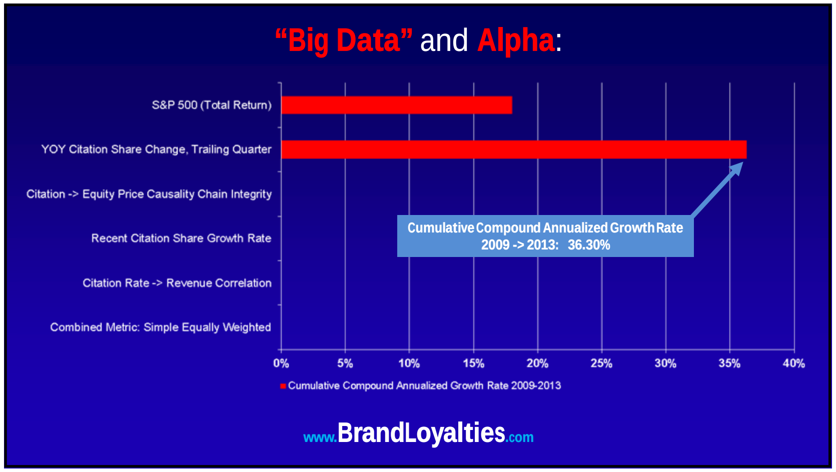
"Big Data" and Alpha:
S&P 500 (Total Return)
YOY Citation Share Change, Trailing Quarter
Citation -> Equity Price Causality Chain Integrity
Recent Citation Share Growth Rate
Citation Rate -> Revenue Correlation
Combined Metric: Simple Equally Weighted
Cumulative Compound Annualized Growth Rate
2009 -> 2013: 36.30%
0% 5% 10% 15% 20% 25% 30% 35% 40%
Cumulative Compound Annualized Growth Rate 2009-2013
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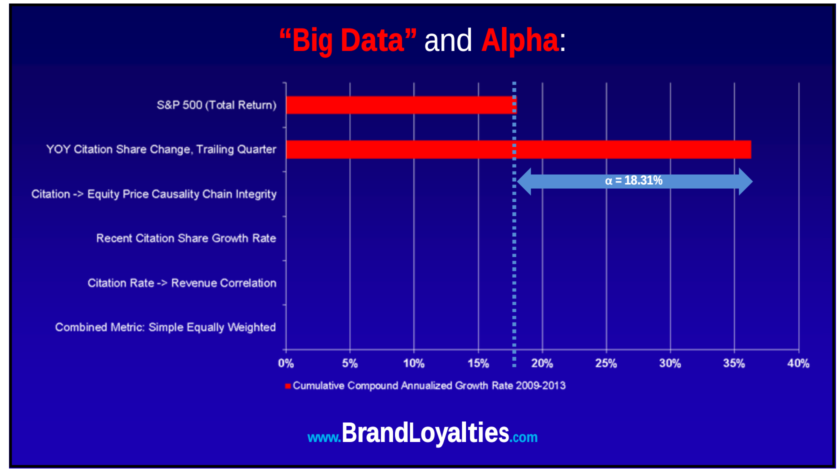
"Big Data" and Alpha:
S&P 500 (Total Return)
YOY Citation Share Change, Trailing Quarter
α = 18.31%
Citation -> Equity Price Causality Chain Integrity
Recent Citation Share Growth Rate
Citation Rate -> Revenue Correlation
Combined Metric: Simple Equally Weighted
0% 5% 10% 15% 20% 25% 30% 35% 40%
Cumulative Compound Annualized Growth Rate 2009-2013
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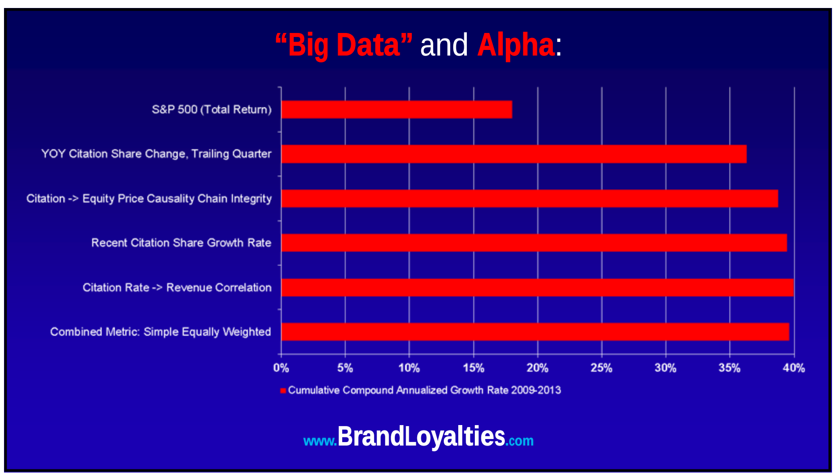
"Big Data" and Alpha:
S&P 500 (Total Return)
YOY Citation Share Change, Trailing Quarter
Citation -> Equity Price Causality Chain Integrity
Recent Citation Share Growth Rate
Citation Rate -> Revenue Correlation
Combined Metric: Simple Equally Weighted
0% 5% 10% 15% 20% 25% 30% 35% 40%
Cumulative Compound Annualized Growth Rate 2009-2013
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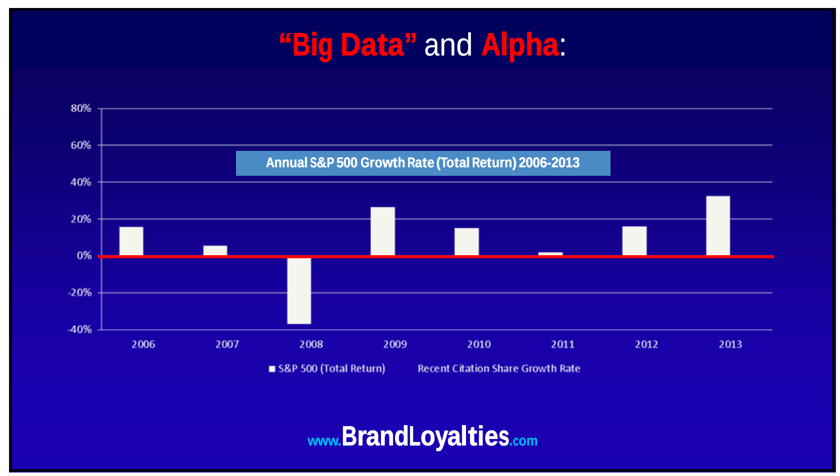
"Big Data" and Alpha:
80% 60% 40% 20% 0% -20% -40%
Annual S&P 500 Growth Rate (Total Return) 2006-2013
2006 2007 2008 2009 2010 2011 2012 2013
S&P 500 (Total Return)
Recent Citation Share Growth Rate
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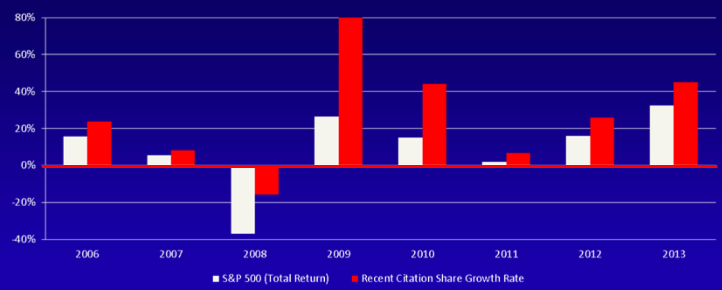
"Big Data" and Alpha:



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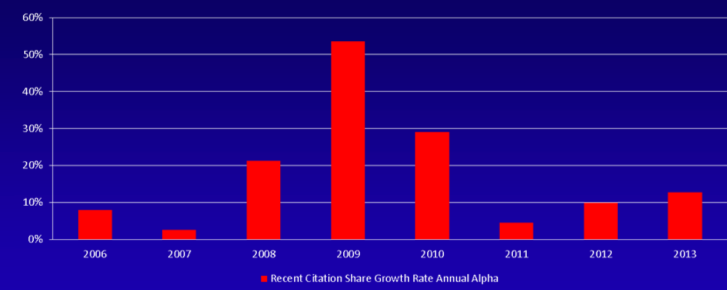
"Big Data" and Alpha:



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"Big Data" collecting issues:

- Scale of on-line activity has changed drastically over time
  - In 2006 most data was from desktop searches and shopping carts
  - Now mobile apps and social media provide the bulk of the data
  - The nature and locus of commerce is constantly evolving – as are demographics
  - Raw citation rates have grown by two orders of magnitude since 2006 – while consumer commerce (real PCE) has increased less than 9% (3% per capita)
- Citation rate -> Revenues relationships require constant "normalization"

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"Big Data" collecting issues:

- Time granularity needs to match desired actionable signals
  - Quarterly (or better) resolution for general research
  - Weekly (or better) resolution to anticipate earnings reports
  - Daily resolution for alerts to unfolding PR "events"
- Scale of collected data must match extent of corporate markets/revenues
  - How many languages must be scanned / translated?
  - How many character sets must be utilized?
  - Are Simplified Chinese citations relevant? Mandarin? Cantonese?

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“Big Data” collecting issues:

- Dealing with Low Luminosity Signal / Noise Ratios
  - Especially critical for Small / Micro Cap Corporations
  - Aggressive Signal Amplification Methodologies
  - Seeking mean signal level that is >= twice the sample’s sigma
  - Adjusting sample time aperture dynamically to create sliding meta-samples
  - Utilize growth percentiles to handle vast citation scale differences

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“Big Data” processing issues:

- Processing requirements often scale geometrically with scope of data
  - Pattern searches scale geometrically with number of target variables
- If you are collecting tens of billions of daily communications
  - Think grids with thousands to tens of thousands of processors
  - Think NSA scale processing resources (and “black” budgets)
- Storage of exabyte scale (10^{18}) historic data can become a challenge
  - Data needs to remain “on-line” to facilitate historic correlations
  - Data set integrity does not permit time based purges

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So, how can analysts utilize

“Big Data”

as a new “fundamental” data source to help

Optimize Investment Decisions?

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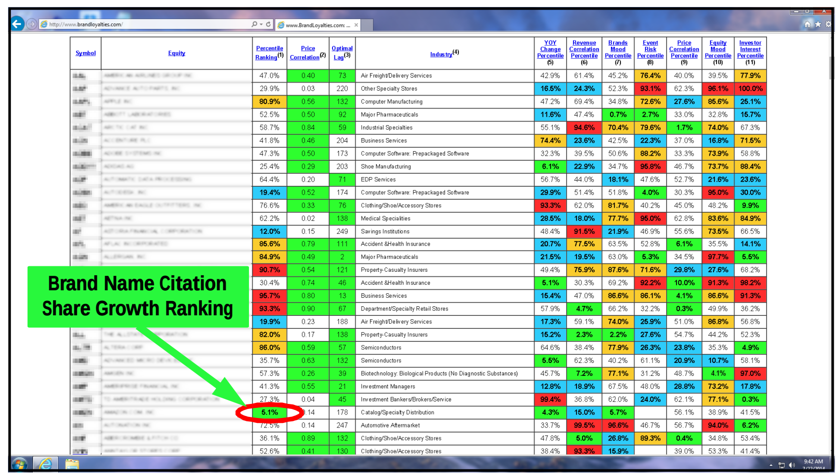
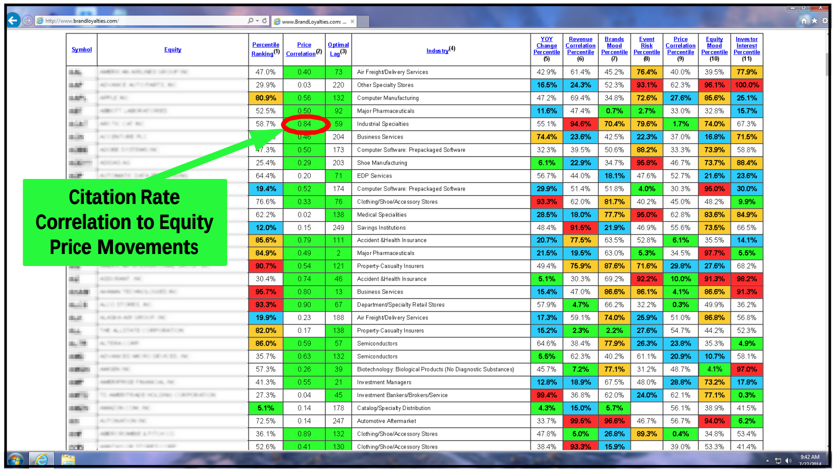
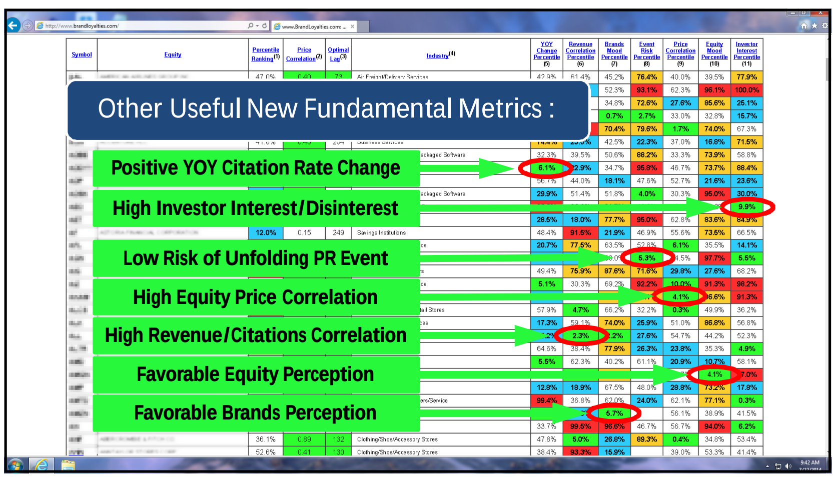
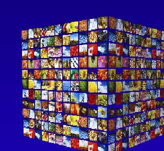






"Big Data" Summary:

- Big Data is a pervasive and growing consequence of billions of people simply living life in a digitally connected 21st Century



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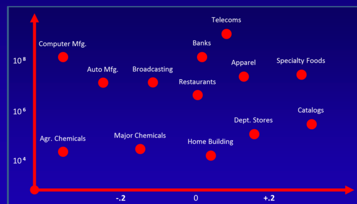
"Big Data" Summary:

- For certain classes of equities it can provide useful business intelligence and investment fundamental data
  - Typically those involved in discretionary durable goods trade



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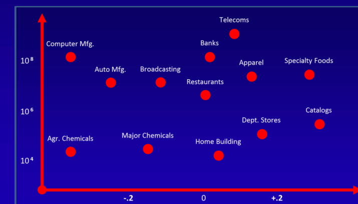
"Big Data" Summary:

- The usefulness of the extracted data depends on:
  - Signal luminosity: baseline commerce and "event" generated
  - Signal relevance: correlations to revenue and equity pricing



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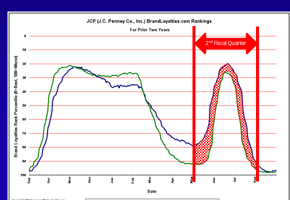
"Big Data" Summary:

- Investment Fundamental Data that can be extracted include:
  - Changes in citation rates / customer loyalty over time
    - During ongoing live fiscal quarter
    - YOY relative to year-ago fiscal quarter



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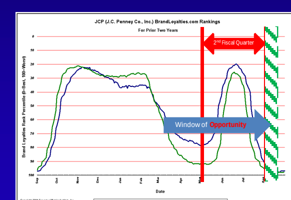
"Big Data" Summary:

- It can tell us how loyal customers are to the brands of a corporation
  - Before earnings reports or issued guidance
  - In some cases before corporate "insiders" fully grasp what's happening in their own extended distribution channels



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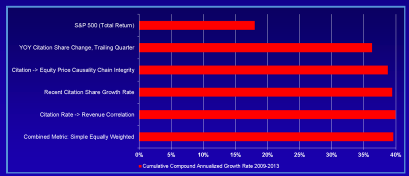
"Big Data" Summary:

- At least four "Big Data" metrics could be used to generate significant α
  - Recent normalized citation share growth rate (ranked –vs– peers)
  - YOY change in trailing quarter citation share growth
  - Citation rate -> revenue correlation
  - Integrity of citation rate -> revenue -> earnings -> equity price causality chain



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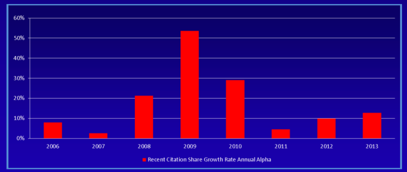
"Big Data" Summary:

- Such α can be shown to be consistent over an entire market cycle
  - Risk mitigation 2006-2008
  - Explosive upside 2009-2010
  - Persistence during stability 2011-2013



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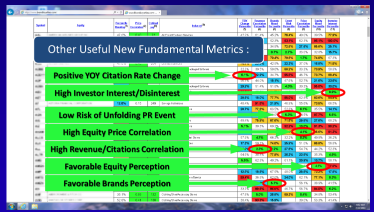
"Big Data" Summary:

- "Big Data" fundamental metrics can help portfolio managers choose consumer equities that significantly and consistently augment α



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For additional information please visit:

BrandLoyalties.com/QWAFAFEW

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