This report explains how social media’s big data has evolved from the consumer products world to the financial world as money managers seek an informational edge to enhance their investment processes. The exponential growth of investment-related content on social media provides a vast dataset to analyze in order to identify actionable insights which can potentially identify stocks that will outperform.
Powerful Technologies Can Unlock Investment Insights from Big Data

BIG DATA, ARTIFICIAL INTELLIGENCE & NATURAL LANGUAGE PROCESSING

The internet has connected the world as never before, breaking down informational barriers and allowing us to share and collaborate in ways previously unimaginable. Big data has come to represent the collective information that is available from varying sources all over the world. Big data analysis can yield a wealth of knowledge that can be used to track, explain, and potentially predict, the big picture.

The Digital Universe: 50-fold Growth from the Beginning of 2009 to the End of 2020

Processing and making sense of big data is beyond what any individual could analyze on their own. Advances in artificial intelligence (AI) techniques used in big data analysis allows for a deeper understanding of vast amounts of data, specifically data from the ever growing social media landscape. While AI may conjure thoughts of cyborgs and robots, at its core, AI is designed to help process data, make sense of it, and act on it.

Natural Language Processing (NLP) is the branch of computer science that deals with the interpretation, meaning, classification, and sentiment analysis of text. Advances in NLP techniques allow for more accurate sentiment analysis than ever before. Moving beyond traditional key word searches, Natural Language Processing today has evolved to provide individuals insights regarding the contextual meaning of datasets.

GROWTH OF SOCIAL MEDIA

The emergence of social media has opened up numerous new forums for people to express their opinions and share experiences. In the U.S., 78% of the population has a social network profile. Headlines cross Twitter feeds faster than news networks. The proliferation of social media has created a vast set of data that can be analyzed to understand behaviors, trends and sentiments and ultimately help make better decisions.
SOCIAL MEDIA USES IN THE WORLD OF BRAND AND CONSUMER ANALYTICS

Consumer product companies were the first to use predictive analysis from social media to help them identify marketing insights and manage their brands. Across the social media landscape, individuals routinely express their opinions of a product, experiences within a store, and general encounters with various brands. Large technology companies such as salesforce.com and IBM offer numerous social media monitoring tools to help the world’s leading brands capture insights from social media conversations.

ADOPITION OF SOCIAL MEDIA ANALYTICS WITHIN THE FINANCIAL WORLD

The investment world – which has always been on the lookout for new ways to gain an informational advantage – has likewise recognized the value of big data. Today’s leading asset managers routinely incorporate big data analytics within their investment processes.

Early attempts at stock sentiment analysis included offline (phone, paper) surveying, in-store questionnaires, and even door-to-door polling. However, it is well documented that people often say one thing when participating in a survey but then act in a different manner. Searching for deeper insights with respect to a company’s investment merits, hedge funds and other asset managers deployed specialty research firms to position canvassers at physical store locations, counting customers and conducting ad-hoc polls in an effort to understand sales patterns and product demand. Not only were these methods time-consuming and resource-intensive, they were also limited in the number of people they could reach.
Today, millions of people voluntarily share their views not only about their own consumer behaviours and brand perception, but also their activities related to their investment ideas and portfolios. Over the past few years, the number of investment specific social media platforms has grown in response to increasing user adoption of social media as a forum for investment related discussion. During this time, user generated content has accelerated at an exponential rate. The result has been a proliferation in the breadth of discussion, depth of data and diversity of subject matter. Twitter’s adoption of the “Cashtag” methodology ($+ "TICKER") in the summer of 2012 further enabled the growth of online content by providing a standardized structure to track stock specific discussions.

Growth in Finance Discussion on Twitter

Source: GNIP. As of April 30, 2014.
FINANCIAL APPLICATIONS OF INVESTMENT INSIGHTS FROM THE SOCIAL MEDIA LANDSCAPE

Large quantitative hedge funds were early adopters in integrating social media analytics into their investment processes. This investment approach was further validated when leading financial data providers such as Bloomberg and Thomson Reuters began offering investment insights based on social media data to their subscribers. More recently, insights generated by social media analytics have been offered to retail investors of several large brokerage firms. TD Ameritrade and Fidelity now provide social scoring metrics to their clients in addition to traditional fundamental research and technical indicators.

CAN SENTIMENT PREDICT STOCK PRICES?

Traditional asset pricing theory, fundamental analysis, relative value and other factor based approaches are typical methods deployed by investors in determining the investment merits of stocks. These methods are proven over a long time horizon; however, they often fail to explain short and medium-term stock price fluctuations. So, what influences asset price movements over these time periods? In our view, the answer is sentiment. Numerous studies have shown that investor sentiment plays an important role in financial markets. Investors have historically relied on rudimentary survey-based measures of sentiment for insights. Investor surveys such as the University of Michigan Consumer Sentiment Index and the AAII investor sentiment survey suffer from limitations associated with traditional survey-based approaches including negative bias potential, low incentive for truth-telling and reporting time-lags. Sentiment indicators derived from insights from the social media landscape have a distinct advantage relative to traditional survey-based approaches. User comments within the social media landscape are voluntarily generated and posted in real-time. The desire for collaboration and attaining social influence further self-regulates the discussion while fostering an environment with a high incentive for truth-telling.

In fact, there are numerous research studies published by academia relating to the potential power of sentiment insights derived from social media. These academic research reports find compelling evidence linking investor sentiment data derived from the Social Media landscape in predicting future stock performance. Notably, in the report titled “Identification of a Social Media Equity Factor Derived Directly from Tweet Sentiments”, professors Jim Liew and Tamas Budavari found “significant evidence that the characteristics of securities derived from social media information sources have significant power in explaining the time-series of daily returns”, while Patrick Houlihan and Germán Creamer found a similar relationship in their research report titled “Leveraging Social Media to Predict Continuation and Reversal in Asset Prices”. Their research showed “that message volume and sentiment from StockTwit messages contained information about future price changes.”
Summary

EXPONENTIAL GROWTH OF SOCIAL MEDIA’S BIG DATA
The exponential growth of online discussions about individual stocks and companies on social media platforms provides a rich new dataset.

THE POTENTIAL TO GAIN AN INFORMATIONAL EDGE
Advances in AI and NLP technologies enable investors to harness this vast dataset to identify actionable investment insights about individual stocks, a task that a few years ago would have been impossible.

GROWING EVIDENCE THAT INVESTOR SENTIMENT CAN BE PREDICTIVE OF STOCK RETURNS
There is a growing body of academic research that links investor sentiment with future stock performance. See Appendix for a sample of related studies.
The BUZZ Social Media Insights Index ("BUZZ Index") employs leading edge analytics to harness the power of Social Media’s Big Data to uncover actionable investment insights that are predictive of stock market returns.

The BUZZ Index identifies the 25 most bullish stocks in the market based on investment insights derived from the Social Media collective.

**Social Universe**

The BUZZ Index employs state of the art Natural Language Processing Algorithms and Artificial Intelligence Frameworks.

**The BUZZ Process**

1. From a defined investment universe of U.S. stocks, the BUZZ Index targets the 100 most mentioned stocks across the Social Media landscape. The more active the conversation, the greater the reliability of the BUZZ.

2. The BUZZ Index looks at what the Social community is saying about these top 100 stocks and whether the BUZZ is positive, negative or neutral on a collective basis.

3. The BUZZ Index pinpoints influencers within the Social community and identifies whose tweets and posts are most likely to impact collective opinion. It also identifies and scores which members of the Social community have historically been the most successful in their forecasting accuracy.

**Insights Scoring**

1. Select the 25 stocks with the most bullish scores

2. Reconstitute the Index each month to capture the latest Big Data driven insights, positioning the Index to capture the highest return potential.
## Index Holdings (As of April 14, 2016)

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>WEIGHT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alphabet Inc.</td>
<td>13.41</td>
</tr>
<tr>
<td>Apple Inc.</td>
<td>11.37</td>
</tr>
<tr>
<td>Alcoa Inc.</td>
<td>7.93</td>
</tr>
<tr>
<td>Walt Disney Co.</td>
<td>6.03</td>
</tr>
<tr>
<td>Gilead Sciences Inc.</td>
<td>5.31</td>
</tr>
<tr>
<td>Abbvie Inc.</td>
<td>4.90</td>
</tr>
<tr>
<td>Opko Health Inc.</td>
<td>4.90</td>
</tr>
<tr>
<td>Tesla Motors Inc.</td>
<td>4.66</td>
</tr>
<tr>
<td>Kinder Morgan Inc.</td>
<td>4.66</td>
</tr>
<tr>
<td>Ford Motor Co.</td>
<td>4.66</td>
</tr>
<tr>
<td>Sirius XM Holdings Inc.</td>
<td>4.66</td>
</tr>
<tr>
<td>Facebook Inc.</td>
<td>3.47</td>
</tr>
<tr>
<td>Valeant Pharmaceuticals International, Inc.</td>
<td>3.36</td>
</tr>
<tr>
<td>Celgene Corp.</td>
<td>3.33</td>
</tr>
<tr>
<td>Intel Corp.</td>
<td>2.96</td>
</tr>
<tr>
<td>Twitter Inc.</td>
<td>2.18</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>1.90</td>
</tr>
<tr>
<td>AT&amp;T Inc.</td>
<td>1.81</td>
</tr>
<tr>
<td>Jetblue Airways Corp.</td>
<td>1.59</td>
</tr>
<tr>
<td>Nike Inc.</td>
<td>1.50</td>
</tr>
<tr>
<td>Altria Group Inc.</td>
<td>1.33</td>
</tr>
<tr>
<td>Biogen Inc.</td>
<td>1.07</td>
</tr>
<tr>
<td>Visa Inc.</td>
<td>1.03</td>
</tr>
<tr>
<td>Yahoo! Inc.</td>
<td>0.99</td>
</tr>
<tr>
<td>Freeport-McMoRan Inc.</td>
<td>0.97</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Holdings are subject to change. An investor cannot invest directly in an index. The Fund will invest at least 90% of its net assets in securities that comprise the Underlying Index. Under normal conditions, the Fund generally will invest in all of the securities that comprise the Underlying Index in proportion to their weightings in the Underlying Index; however, under various circumstances, it may not be possible or practicable to purchase all of the securities in the Underlying Index in those weightings.

## Appendix

The following is a sample of available research within the field:

1. “Twitter mood predicts the stock market” — Bollen, Mao, and Zeng (2011)
2. “Predicting Stock Market Indicators Through Twitter” — Zhang, Fuehres and Gloo (2011)
11. “Leveraging Social Media to Predict Continuation and Reversal in Asset Prices” — Houlihan and Creamer (2015)
IMPORTANT DISCLOSURES & DEFINITIONS

An investor should consider the investment objectives, risks, charges and expenses carefully before investing. To obtain a prospectus, which contain this and other information please contact your financial professional or call 1.855.215.1425. Read the prospectus carefully before investing.

Sprott Buzz Social Media Insights ETF shares are not individually redeemable. Investors buy and sell shares of the Sprott Buzz Social Media Insights ETF on a secondary market. Only market makers or “authorized participants” may trade directly with the Fund, typically in blocks of 50,000 shares.

The Fund is not suitable for all investors. There are risks involved with investing in ETFs including the loss of money. The Fund is considered non-diversified and can invest a greater portion of assets in securities of individual issuers than a diversified fund. As a result, changes in the market value of a single investment could cause greater fluctuations in share price than would occur in a diversified fund.

The ability to invest based on social media analytics is relatively new and untested. The Fund may invest a significant portion of its assets in securities issued by companies in the information technology sector in order to track the Underlying index’s allocation to that sector. Funds that emphasize investment in small/mid cap companies will generally experience greater price volatility.

The fund is new and has limited operating history.

Diversification does not eliminate the risk of experiencing investment losses.

ETFs are considered to have continuous liquidity because they allow for an individual to trade throughout the day.

Big Data is a term for data sets that are so large or complex that traditional data processing applications are inadequate.

Natural Language Processing (NLP) is a field of computer science, artificial intelligence, and computational linguistics concerned with the interactions between computers and human (natural) languages. As such, NLP is related to the area of human–computer interaction.

Artificial Intelligence (AI) is the intelligence exhibited by machines or software. It is also the name of the academic field of study which studies how to create computers and computer software that are capable of intelligent behavior.

Hedge Funds are alternative investments using pooled funds that may use a number of different strategies in order to earn active return, or alpha, for their investors.

Fundamental Analysis is a method of evaluating a security that entails attempting to measure its intrinsic value by examining related economic, financial and other qualitative and quantitative factors.

Relative Value is a method of determining an asset’s value that takes into account the value of similar assets.

Technical Indicator is any class of metrics whose value is derived from generic price activity in a stock or asset.

Capital Asset Theory is a model that describes the relationship between risk and expected return and that is used in the pricing of risky securities.

ALPS Portfolio Solutions Distributor, Inc. is the Distributor for the Sprott Buzz Social Media Insights ETF.