Analytics in Capital Markets: Deriving Strategic Value from Data to Gain Competitive Edge
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“May you live in interesting times”, says a Chinese proverb. The capital markets industry today is confronted with the proverbial interesting times. While business has stabilized and appears to be on the path to recovery, the industry too is reinventing itself. There are multiple business drivers at play in the current landscape - a challenging business environment, emergence of disruptive technologies, customers' dynamic expectations, regulators' insistence on obtaining more data from participants, and most importantly, an increased need to contain costs and inefficiencies. With these imperatives, it is important that capital market participants like investment banks, brokerages, and asset managers tap into data mines to gain the deep market insights required to sustain in this excessively competitive business environment. It is also crucial to understand customer needs and come up with profitable products that are in tune with the times while ensuring faster go to market. This white paper analyzes some key business functions that can effectively leverage data analytics to help capital market firms gain a competitive edge.
Emerging Business Drivers in Capital Markets

Global capital markets are now witnessing signs of recovery with improved investor confidence and rising trading volumes. However, apart from the heightened regulatory pressures in the aftermath of the 2008 crisis, evolving customer needs and advances in technology are also impacting the growth plans of capital market firms. In such a business environment, capital market participants must reassess their strategies and business models on priority, factoring in the following emerging trends:

- The trading community is evaluating opportunities in high-frequency trading (HFT) or algorithm (or algo) trading mindful of the associated pitfalls and its unintended consequences. However, new regulations in HFT insist on better risk control, and system safeguards like control over order flows, drop copies of orders, and kill switches.

- The wealth management world is seeing a rise in young tech savvy customers due to intergenerational wealth transfer. This segment is driving the need for new disruptive wealth advice models like mirrored investing, crowdsourcing of investment advice, and freemium services.

- Over-The-Counter (OTC) markets are moving toward greater adoption of swap execution facility (SEFs), new products like futurized swaps, new ways of risk management through a centralized clearing of OTC, and oversight measures that include reporting to swap data repositories (SDRs) or trade repositories (TRs), and portfolio compression. Moreover, the International Swaps and Derivative Association (ISDA) has also called for the use of transaction identifiers like unique swap identifiers (USI) or unique trade identifiers (UTI) in derivative data reporting.

- Collateral management is taking center stage as the industry anticipates surge in demand for collateral. Firms are exploring algorithms like ‘cheapest to deliver’ to optimize their inventory, tools to track global inventory, and applications that allow single views of all held assets to tighten collateral operations.

- Back offices are looking at T+2 settlements in the near term in many important markets. In Europe, TARGET2-Securities (T2S) is changing the way central securities depositories (CSDs) operate, bringing about harmonization across European markets. The T2S engine is a pan-European settlement platform that aims to provide delivery versus payment (DvP) settlement in central bank funds. With reducing settlement cycles, areas like fails management, dispute resolution, and reconciliation are gaining closer attention from efficiency and process improvement perspectives.

Overall, the emerging concept of interconnectedness across the ecosystem is creating new operational risks while opening new business avenues. In this dynamic business scenario, the success of capital market firms will depend on how they leverage technology, and how they anticipate and adapt to evolving customer and market needs. Along with the traditional high velocity data that capital market firms deal with, the volume and variety of data is reaching explosive proportions. The use or interpretation of this data by leveraging business analytics, to improve business and profits will be the key challenge over the next decade.
Emerging Role of Analytics

Capital market firms have been using analytics based on structured data for some time now, however, mostly as historical analytics (descriptive and/or diagnostic). Old world analytics would typically state the obvious with the most intuitive reasons. However, now market participants are looking not only for predictive analytics but also for prescriptive analytics including prospective transaction modeling. They want to know which strategies would work, why they would work, the risks involved, and the options available to change course mid-way. This may necessitate leveraging visual analytics using both structured and unstructured data.

The next generation of analytics will involve leveraging technology and data to grasp market opportunities like never before. The new breed of analytics is capable of providing real-time insights into the business based on data streams traditionally considered to be of no value. They provide a significant competitive advantage to firms based on the predictive value. This edge translates into profitable growth, better customer relationships, improved operational efficiency, and superior resource management (cash, collateral) for capital market firms.

Based on their specific requirements, the options for capital market firms would include, but are not limited to, those mentioned in Figure 1.

**Figure 1: Role of Analytics and its Application in Capital Markets**

(Source: TCS Internal)
Industry Initiatives and Emerging Practices

Emerging paradigms help firms tap into the hidden value of data. Realizing the full potential of data requires innovations in analytics at various levels – the kind of data accepted to the way it is read, hosted, and presented. Given the numerous innovations in the analytics space, several use cases or applications pertaining to the capital markets are available.

Tapping unstructured data sources for comprehensive insight

Capital market firms use raw data drawn from multiple sources, with most of it being unstructured, such as that from social media, news, reports, videos, and sensors. Smart analytics like sentiment analysis of social media content and news is increasingly becoming vital to the trading environment. This is invaluable for trade timing (news based analytics), stock valuation, commodity pricing (using weather data, soil quality, and demand trends), initial public offerings, and product launches (media mining to understand sentiment towards the offering).

Capital market firms are now using news from social media sites for their algorithms and for their trading decisions. Even the largest of the asset managers are riding this trend. A leaked news can be mined by an analytics firm and sent as an alert to its clients (sell side firms, asset managers). Traders in these firms can use this information in their algorithms, and trade on the basis of it for a couple of minutes before it is flashed in the public domain. The value of these ‘few minutes’ cannot be underestimated. Such is the power of non-traditional data sources.

Reducing decision time by using in-memory analytics processing

In–memory analytics processing queries data stored in the random access memory (RAM) as against data on physical disks. This results in significantly reduced data query response times, thus allowing business analytics applications to support faster business decisions. Trading firms can run new scenarios or complex analytical computations extremely fast, transforming data to decisions almost instantaneously. They can explore, visualize, and analyze data sources to tackle problems and get insights never before considered due to computational limitations. Low latency usages like algorithmic trading can leverage in-memory analytics.

Deploying customized solutions by leveraging app stores

App stores are the emerging delivery and distribution avenues for specialized analytics vendors seeking to enhance the uptake of their products. App stores offer affordable analytics products to financial firms, providing an alternative to the relatively expensive, traditional vendors. Moreover, this new breed of vendors use different sources of data unlike the standard sets of input data streams that are used by the traditional vendors. However, this may result in commoditization of analytics. Smaller capital market firms may use such specialized analytics applications like profit and loss or risk dashboards, reporting tools, and fraud detection from established app stores.
Optimizing costs using cloud based analytics

Analytics implementation and infrastructure requires huge investments, and thus may not appear attractive to smaller firms or firms with a limited budget for analytics. A cloud platform based analytics solution offers a high level of flexibility in usage based on demand. This ensures a consistent and reliable performance to customers, while taking care of demand surge scenarios. Enterprise strength security provided by service providers is another advantage. For firms that have sporadic needs and do not intend to invest in a permanent analytics solution, but still want to leverage this cutting edge technology, a cloud based analytics solution is ideal.

Establishing adaptive mechanisms by leveraging machine learning

An extension of artificial intelligence, machine learning refers to algorithms that evolve from learnings derived from previous results and supplied data. The algorithm adapts itself to the evolving problem iteratively to produce reliable results. This can find application in a variety of capital market applications like surveillance, fraud detection, and stock selection. There are various methods for machine learning like artificial neural networks (ANN), multilayer perceptron (MLP), and geospatial predictive modeling. While still in a nascent stage, these are expected to open up new avenues for analytics.

Making effective business decisions through visual data discovery

Unlike traditional business intelligence reports that offer static inputs, visual data discovery is interactive and insightful. It allows traders and financial advisors to query data, get results, and pose follow-up questions in just seconds. Users can further drill down to get details of an outlier, or zoom out to discover emerging trends. Interactive filters can get rid of irrelevant data and noise, allowing users to spot underlying patterns and trends. This approach supports better and faster decisions, irrespective of volume, variety, and dynamicity of data. Visual data discovery finds widespread application, such as in dashboards for profit and loss, risk and compliance management, transaction cost analysis (TCA), and pre-trade analytics.

Gauging consumer behavior by decoding emotions of data

Social media sites like Twitter and Facebook capture the public mood. Previously dismissed as useless chatter, close tracking of these posts reveal sentiments toward a particular product, service, or firm. Analytics firms now have products to scan millions of tweets and social media posts to understand the underlying customer sentiments. We have observed that stocks with positive social sentiment yield higher returns compared to the ones with negative sentiment.
Transformation Opportunities in Capital Markets

Use cases for capital market firms

Financial markets are dynamic, complex, and unpredictable. To profit in such markets, capital market firms (market infrastructure, sell side, and buy side) must leverage all available data for competitive advantage.

Data is growing in a non-linear manner and firms must analyze, understand, and interact with it irrespective of its variety, velocity, or structure.

Currently, capital market firms use analytics predominantly for key functions that impact revenue such as trading, compliance, and risk management. Market infrastructure firms like exchanges, clearing houses, CSDs, and regulators too have now discovered the power of analytics. The Deutsche Börse Group recently announced the introduction of real-time analytics for futures contracts traded on Eurex. The organization believes this enhanced offering will provide investors and analysts with greater insights to evaluate market activity and trends. Securities exchanges can use analytics for market surveillance to identify patterns of trades and positions, and to provide value-additions to customers in market data business. In addition, regulators across the world expect to get huge volumes of data for OTC derivatives trades.

Analytics could be of tremendous value to make sense of this complex data. CSDs can leverage analytics in emerging areas like collateral management that have become significantly important to participants due to regulations. Table 1 depicts some functions where capital market firms can benefit using analytics.

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Global regulators receive and scan millions of data records of market transactions from market participants, on a daily basis. The data reporting and record keeping requirement is growing exponentially as new regulations are finalized. The Dodd Frank Act in the US and European Market Infrastructure Regulation (EMIR) and Markets in Financial Instruments Directive (MiFID) in Europe are just some examples of regulations that demand that firms maintain trade data records.
Technology driven innovation does come with its set of challenges. Due to the proliferation of newer technologies needed for analytics, firms are required to support different technology standards for their applications. This essentially involves increased cost of licenses, development, infrastructure, and maintenance. Further, the shorter life-span of some new technologies poses other challenges in the form of scalability, maintainability and homogeneity of technology architecture.

Realizing the full potential of analytics is contingent upon a firm's ability to tap into the myriad data sources available – structured, semi-structured, and unstructured. However, coping with the challenges of volume, variety, and velocity of data requires a comprehensive and enterprise-wide approach that takes into account the following aspects:

- Technology vendors’ and financial firms’ focus on handling real-time churn of high speed unstructured data
- Ability to extract even the minutest element of actionable insights from enormous volumes of varied data sets is the ultimate aim as these threads could potentially be worth millions
- Data taxonomy, proposed regulatory standards such as USI and Unique Product Identifier (UPI, and UTI in OTC markets
- Data management, which includes extracting it from multiple sources, loading into warehouses, and transforming it into useful information
- Processes and policies pertaining to data storage, quality, and governance, from source to destination

Overall, a planned approach to utilize analytics technology and data infrastructure will allow capital market firms to achieve higher levels of return on investment (RoI), reduce risks, and address increasing customer and regulatory demands.

Before strategizing implementation of analytics techniques, organizations need to fully understand the extent of utility of analytics for their business, and not attempt a force fit. Stakeholders from multiple functions need to evaluate the opportunities where analytics can be applied in their respective areas. Additionally, they need to identify the possible business benefits as well as estimate the associated investments and short-term and long-term returns. Once a visible need and a compelling business case for deploying an analytics solution comes to fore, organizations should assess the current capability and maturity level of data and technology infrastructure. A thorough evaluation of the current and the required technology state, considering the infrastructure costs and business benefits, will prove instrumental in apportioning the right amount of resources to this initiative.

The Way Forward

Analytics can help capital market firms tap into a host of structured and unstructured data sources, eliciting powerful nuggets of information that can prove useful in faster and effective decision making. With traditional analytical and data visualization techniques no longer capable of handling the volume, variety, and velocity of emerging data, capital market firms must invest in new infrastructure and visualization tools. To begin with, firms should thoroughly evaluate their business needs, map them with the available analytics tools, and draw up a comprehensive analytics strategy. A strategy that addresses all the inherent challenges will deliver significant benefits, including greater RoI and improved risk management, to capital market firms.

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