



CME Group:

Modeling Costs to Change Behavior

“I’m trying to take very complicated services and turn them into component pieces so the business can understand what they can potentially influence, so that I’m not continually buying technology to meet a demand that’s growing. To turn that around, we’re really asking, ‘what is the profitability of our customers in a digital economy? The cost of a transaction that exists is zero, but how does it exist? It exists because we put power into it; it exists because we have people to serve it. We have to look at the peak to command the trends.”

—Carl Stumpf, Managing Director and Technology Controller, CME Group

The Back Story

CME Group is the world’s leading and most diverse derivatives marketplace, handling three billion contracts worth approximately \$1 quadrillion annually (on average) and earning annual revenues of nearly \$3 billion (\$2.9 billion in 2013). The company provides a marketplace for buyers and sellers, bringing together individuals, companies and institutions that need to manage risk or that want to profit by accepting risk. The group was formed in 2007 through a merger between the Chicago Mercantile Exchange and the Chicago Board of Trade. As an electronically driven organization, CME Group has about 1,000 employees in IT.

Understanding Costs

At CME Group, trade orders drive costs but trades themselves are profitable. About half the costs of each trade are technology related. From a technical standpoint, CME utilizes trades as end-to-end services that go into the trading, clearing, and regulatory platforms. These services require infrastructure, applications, and developers to run.

CME Group has been reviewing the costs of services by vertical – equities, oil, gas, and other commodities – to try to determine the outcome of some critical questions: What is the profitability of its products and what are the impacts of making different decisions on forward-looking profitability? And how can the group manage the demand for technologies to help reduce costs and improve profitability?

Spikes in Demand Drive Costs

CME Group executes more than three billion contracts each year and more than 10 million contracts per day. Its exchanges offer a vast array of global benchmark products across major asset classes – futures and options based on interest rates, equity indexes, foreign exchange, energy, agricultural commodities, metals, weather and real estate. These products bring buyers and sellers together through an electronic trading platform and trading facilities in New York and Chicago.

Because CME's platform processes electronic trades, and people that trade look for a wide variety of different types of market signals to base their positions, the platforms are subject to peaks in demand. "In our markets, a peak event can occur when there's an announcement from the Fed or some sort of extraneous event, and these peaks can cause a surge anywhere from 100 to 1,000 times normal activity, and it occurs in a very short burst of time," said Carl Stumpf, managing director and technology controller, CME Group. "Our systems need to be designed to meet that peak and meet our customer needs, and that's how we design our entire application."

And because peaks can be unexpected and instantaneous, CME Group has committed to having at least two times the capacity of every peak available for customer demand. And that demand keeps growing.

Summitting the Peaks

Eventually Stumpf and his team hit on an idea: they began to think of the peaks differently. They sat down with experts that run the markets to figure out exactly what happens during a one-second peak. What they found is that customer transaction profiles drove demand. And while there were a lot of efficient customer profiles, there were many inefficient ones, too. If the group could find a way to optimize the inefficient customer profiles, it could significantly reduce the need to keep purchasing gear for the next peak.

The way to bring some parity among efficient and non-efficient customers: Utilize Technology Business Management (TBM) methodologies and tools to understand costs and, more importantly, understand the demand.

The Road to TBM

CME Group had been creating models to measure costs manually, using spreadsheets. But in the mid-2000s, when it began a period of expansion with four separate M&A events, spreadsheets were no longer effective. Then the recession hit. By 2008, the company had to cut wherever it could and cost modeling fell by the wayside.

In 2009, CME Group began to look ahead, planning for growth again. It focused on a set of core initiatives, including the re-implementation of cost modeling. This time, the cost models were enabled by TBM technology and were aimed at one specific goal: Change customer behavior, which in turn impacts demand. Out of that initiative came several objectives:

- Model costs to understand how customer behavior drives demand.
- Optimize results by implementing policies to change customer demand.
- Utilize TBM to understand capacity, and in turn, determine if the business could be structured in a way that only the most important transactions occurred during peaks in demand.
- Understand not only the cost of infrastructure and applications, but the satisfaction levels of customers to balance costs with customer value.

The Net Impact of Actions

Stumpf explained that as IT controller, his organization assumed that the elements that comprised the peaks couldn't be changed. "We solely focused on what could be the supply and capacity side, rather than the focus on the demand side of the equation." But once they narrowed in on demand, and tied in TBM, Stumpf's group began to make correlations that led to specific outcomes, including:

- Utilizing TBM to determine the net impact of the organization's actions on profitability.
- Leveraging relevant costing data and insights to influence internal and external customer behavior as well as executive decision-making.

Changing Behaviors

"We're a very customer-focused organization and if we're going to spend time with customers, it's going to be about how to make their world easier," said Stumpf. "We typically haven't gone to a customer and said, 'we also want to talk to you about efficiency.'"

To influence external customer behavior, the TBM group within IT created a partnership with the business. This group worked with external customers to provide them with information on what it costs to launch a product and what it costs for services. This information directly influences customer demand patterns – before demand enters the exchange. "We're trying to change the demand before it comes to us so I can avoid processing unprofitable work," said Stumpf.

They've also implemented a message efficiency program that models order-to-trade ratios for different types of products offered to external customers, a program that's had a somewhat surprising outcome, according to Stumpf "People thought that if we limit customers in any way, we're going to lose money. That's what everybody told us. In the end we didn't lose money; we became more profitable."

Internally, information is managed at the line-item detail level, enabling CME Group to link and connect data for insights across lines of business. Technology cost is presented to the business by service line, which has led to a better understanding of how demand impacts costs. The outcome: greater efficiency has led to greater profitability.

Outcomes

Socializing Cost Transparency

IT now presents budget versus actuals across the enterprise, for technical and non-technical costs, by service. With the savings it has found through demand management and other cost efficiencies, IT now allows the business to choose where to reinvest those savings — for example, in features that the customers want, in things that regulators request, or security investments. "We have a high demand for features and we have a limited ability to deliver them," said Stumpf. "If we can minimize our investment in certain things, we can invest in other things that our sponsors and customers want."

To socialize its findings, the TBM group created a consolidated view of product profitability. The group models the cost of services against revenue and total margins to provide an objective view of technology and non-technology costs. The findings are presented to executives and line managers to influence internal demand behavior.

Happiness is the Truth

In an effort to determine if its approach really works — that sponsors are happy with the TBM outcomes — the group also created a Satisfaction Index. The Index measures internal customer satisfaction in all apps and drills into the detail across dimensions, including technology and data. "You can't get rid of things that are bad and cheap if all you look at are costs, because the costs look fine," said Stumpf. Instead, the team looks at costs in the context of customer satisfaction, giving them a balanced perspective.

Another impactful thing that CME Group does with the metrics derived through TBM: Provide mobile-accessible status reports, with analytics capabilities for internal customers. According to Stumpf, it all adds up:

“Technology is known as a black box. In order to talk specifically about something that’s difficult, like changing behavior, we have to start with what we’re really talking about – what specific elements that are going to be impacted, and what the specific savings are going to be. In order to change behavior we have to be transparent. TBM enables us to have a story. We build up all the costs and then we align the costs in a way that make sense to the business. Based on that, the business can see how their activities change the cost picture.”

It's A Journey: Next Steps

The CME Group has utilized TBM methodologies and technology to better understand and manage complex and significant aspects of its overall cost structure as a business, especially customer demand at peak times. Internally, there is an expectation that there is more work to be done and that TBM and its corollary projects are a journey and not a destination.

Moving forward, CME Group is finding new ways to disseminate peak demand across its infrastructure, a function undertaken by the architecture group in collaboration with Stumpf's group. By utilizing TBM technologies to implement **Digital Service Efficiency** (DSE) metrics (originally developed by eBay), CME can measure improvements in their technical infrastructure. These metrics are helping measure the impact of architectural changes, such as the use of a spatial computing language and field-programmable gate arrays (FPGA), to change the way that complex, real-time, high volume computations are distributed across a global infrastructure.

The larger goal is to become more efficient, analytical, and scalable, while providing extremely predictable response times and lower overall TCO. Early realized gains include up to 220x the current system (34 million theoretical options pricing per second). The end result is ideally more speed, less power consumption — and less infrastructure.



About the Technology Business Management Council

The TBM Council is a group of more than 1,200 CIOs and other business and technology executives who are passionate about applying business disciplines to better run their technology organizations. Founded by **Apptio**, the leading and independent provider of TBM solutions, the TBM Council is governed by an independent board of directors and is a nonprofit organization. Apptio remains the Council's **technical advisor**.

Our mission is to serve our members and the CIO profession by defining a decision-making framework that creates and sustains business value by balancing the supply of and demand for technology services. The Council's objectives are to publish a generally accepted set of TBM practices and facilitate benchmarking by business technology leaders against those practices.

The Council is open to any **qualifying** CIO or senior IT executive. Learn more at **TBMCouncil.org**.