Agile Portfolio Management at NYSE

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Abstract—In December of 2008, at the height of the financial crisis when the bottom-line was more important than ever and pressures at their highest, I took an opportunity at the New York Stock Exchange’s young division branded NYSE Technologies. The exchange was transforming to becoming less of a financial company and more of a technology firm that provides premiere products and services to players within the financial industry. This division is client facing with the ambitious goal of being a several billion dollar business within five-to-ten years.

In order to be successful I had to tackle several challenges: organizing teams with no process, overcoming the bureaucratic hurdles from NYSE proper, assisting management in determining which greenfield, new, and existing products were worth pursuing/developing, road mapping, measuring ROI and value, and meeting each business unit’s revenue goals.

I. THE OPPORTUNITY

NYSE Euronext had made several acquisitions of small technology companies building financial products or providing some form of financial services for investment firms since 2006. In 2008 they named this new division comprised of a number of different start-ups, NYSE Technologies. This was all a part of their effort to transform the organization into more of technology firm and less of a finance company. Having a physical presence to conduct trades on the NYSE Trading Floor was becoming less relevant. The majority of trades are occurring electronically and many other, purely electronic and dark pool exchanges were eating away at the market share for providing liquidity. NYSE needed to adapt to the times. Part of their vision for this new division was to basically manage the infrastructure and connectivity of all trading/financial messaging transactions and data. The selling point: finance/investment firms are in the business of making sound investment/trading decisions and not in managing the infrastructure and software around that.

After being heavily involved and known in the Agile circles in the New York City area while working at McKinsey & Company, NYSE approached me with an opportunity to assist in helping transform their NYSE Technologies division to manage at a portfolio level the development of, in many cases brand new and unproven, hardware and software products/services in an Agile fashion so that they can be delivered faster to market and where necessary be modified to meet the needs and tastes of their clients.

Now the NYSE Technologies world created an unusual and unique environment. They very much had a start-up mentality among the team members given their respective small-company backgrounds under the umbrella a very bureaucratic and slow management style of a traditional complex corporation in NYSE Euronext proper. Prior to my experience at the exchange, I had worked at a number of large corporate and small startup environments. Yet, the NYSE Technologies world was a unique combination of both. Taking these experiences coupled with applying Agile/lean principles and practices would be no easy feat.

Below was a 2010 picture of the suite of businesses NYSE Euronext was comprised of, with a breakdown of the NYSE Technologies division’s offerings:

II. ASSESSING THE SITUATION & CHALLENGES

To start off my experience at the exchange, three days after beginning my new role there was a complete management re-organization. This would happen six times over my two-year tenure at the firm. The lesson here was that this was a fast changing and demanding environment. The firm was making a huge investment in the division, a strategic decision that all senior executives strongly believed in its long-term success and need. The churn and turmoil in leadership and direction were related to:

- **Short, quick business leadership sprints:** Some senior managers were given an opportunity to lead and pursue their respective products/services and sales strategies. If desired results were not achieved within a given timeframe, they quickly found themselves with little defense justifying whether they should remain in their roles. The bureaucratic style of NYSE Euronext proper didn’t help with expediting things when needed, at least not in the beginning. Now some could argue they weren’t given ample time or
resources to achieve those objectives, but other more nebulous reasons seemed to have been factored in those decisions likely related to the below.

- **Fiefdoms:** The division was compromised of four to five different smaller companies, whose own respective senior managers still felt entitled to a lot of ownership of their own original resources and objectives. This naturally led to reluctance in giving up some ownership for the larger NYSE Technologies division. The metrics for how to measure each of these lines of business, right or wrong, was based primarily on profitability and wasn’t indicative of the strategic importance or intrinsic value of them. This naturally led to a lot of political battles, not just between business heads but also between technical directors on the IT side.

- **Real Assets vs. Fungible Resources:** In the beginning, technology’s personnel all reported to their respected business units. During this period of time the division viewed engineers as generic cogs, or what they called “fungible resources.” The problem here is when you have engineers who have spent time learning the business and building a new technology product/service to meet that market need, replacing that developer as some fungible resource did three things. First, it created a deficit in the knowledge assets and domain expertise that needed to stay within the division by treating them as expendable, and therefore the replacement resources needed to catch up and learn faster than most could do. Second, we were giving away resources, unknowingly, to our competitors who had intimate knowledge about our strategies and inner workings. Thirdly, it didn’t communicate that we valued our most prized assets, our people who made this technology possible. In the beginning technology wasn’t viewed as a respected stakeholder. Due to the mistake that some of our business managers made in viewing our engineers as assembly line workers, there was high turnover because the technology resources felt the fickleness.

- **Sell! Sell! Sell! Sell Vaporware?** The division had plenty of business sales people, but zero product managers (owners). The pressure was very high on these sales people to deliver. One problem was that they did not all have the appropriate training. That was difficult to do as in the beginning these separate start-ups didn’t coalesce around a plan on how their individual products fit into the overall strategy of the division. Also these sales people were very focused on selling on what they knew, usually the around the start-up they either came from or were most familiar with. There was little cross selling in the beginning. In addition, there was no understanding of the capacity of our engineering teams and what could feasibly be delivered in a given timeframe. The pressure on our sales people also led to the selling of vaporware, either because they didn’t understand the products’ limitations or they guessed it wouldn’t take technology that much effort to develop a feature for the product so long as they could close the sale with the client.

I realized we needed a group of product owners (formal or informal) coupled with a consistent, impartial process that took away the political factors and misnomers while keeping focus on the bottom-line for the division: managing our portfolio of projects towards the best opportunity costs

Ultimately I needed to institute a portfolio governance model agnostic to leadership change. But as with anything, I needed to start small. Instituting agile practices at the team/engineering level wasn’t really a challenge. It was setting up a program/portfolio-level framework that’s respected by the business, which would be most challenging. I had the most influence with our technology teams and centered my attention on a single business unit to start my focus.

### III. First Things First: Techniques & Mechanics

In sharing my experience here I make several assumptions here about my audience/readers:

- You are familiar with the Scrum methodology and the use of Fibonacci-like story points.
- As a practitioner you understand the concepts of burn down charts and burn rates.

#### A. Knowing Your Team’s Capacity

I needed reliable metrics. The most important of them was in understanding the capacity of my teams. The business was a stickler for seeing hours/days in any estimate and just running with it as the literal contractual agreement for when any feature is delivered. I’ve always been partial to using (story) points. For one it abstracts the effort, which in reality is part math and part art. By getting reliable velocity averages for my set teams, I would be able to establish the relative capacity for my teams.

#### B. Quick, Large-Scale Backlog Estimations

Next I needed a fast mechanism for teams to estimate new features/products, whole backlogs, as they were presented discovered, usually in the aftermath of a sale/marketing meeting with prospective clients. Traditional poker planning would just simply take too long when you need to quickly estimate complete backlogs consisting of hundreds of user stories/features. Pete Behrens (Trailridge Consulting) [1], a mentor of mine, kindly made a visit to my office one day and lent me an invaluable technique for estimating large backlogs quickly. Pete calls it Visual Estimation. This team technique for estimating gave senior IT and business management the quick estimation of the effort for each prospective feature/product. This coupled with my teams’ established capacity, enabled me to predictably determine my deliveries.

### IV. Managing Opportunity Costs

Despite the having the above, the business mandated that my teams deliver on 100% of the features listed in our
backlogs and for the sake of meeting our sales quotas, to deliver on the next product/set of features for prospective clients where sales were near or already closing. This still ignored the limits of my teams’ respective capacities. I needed something else that made business sense for where my teams would be spending their time: a way to manage opportunity costs.

I developed a good network of Agile practitioners in the New York City area, especially in the financial industry. I teamed up with the likes of David Hersey (ScrumMasters[2]) and Jonathan Miller (at the time he worked as the CTO at S&P). These two, and others, were looking to tackle many of the same issues as I regarding managing a portfolio of projects. A useful technique that we leveraged was the use of business value points on our backlogs.

In the diagram below you will see that we took a backlog of features and assessed their relative business value using a scale to measure what features delivered high, medium, or low business value for the client.

- 5 – Highest Business Value
- 3 – Medium Business Value
- 1 – Low Business Value

Based on our experience in leveraging this model we developed a “Rule of Thumb.”

Remember our circumstances at the exchange: we had tremendous amount of demands by our sales teams, not enough resources, limited delivery timeframes, and required to prove profitability of the products and services we delivered and supported. This sole metric allowed us to begin assessing the real opportunity cost associated with this particular client project/engagement versus spending our resources on another client/sale opportunity. In our own practice we found that nine times out of ten, clients preferred to stop development and accept delivery of the product earlier than later.

How to assimilate this data to the business in terms of dollars and cents to determine real costs? Well there are certain assumptions we made about our costs based on the firm’s standards. Take the following example below:

- Assume resources cost a $100 per hour for a 40 hour work week ($8,000 per resource per 2-week iteration).
- This team is comprised of 9 resources (1 PO, 1 SM, 1 BA, 4 DV, 2 QA).
  - Count all roles - both employee and consultants - directly involved in delivering the project
- Team cost is $72,000 per iteration.
- The team produces a 3-month moving average velocity of 50 story-points per iteration.
- Average Cost Per Point = $1,440 or $4.320 per 3-point feature.

Now for simplicity sake I did not differentiate between the costs of full-time employees versus consultants (onshore and offshore). Obviously you will need to factor that into your calculations should they apply.

In working with our business unit managers and sales leads, we then determined the profit margin we needed to lay on top while tailoring the overall cost to the client based on their circumstances/profile. Now by taking that same exact prioritized backlog of high business value items, we could then perform a cost/profit analysis by feature:

<table>
<thead>
<tr>
<th>Total the story-points in the Backlog</th>
<th>Use the team’s steady-state velocity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Story sizes are arbitrary but are specific to a team and a project</td>
<td></td>
</tr>
<tr>
<td>For more accurate results, bring the work to the team and keep the team stable</td>
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In one example I was able to approach one of our clients about delivering a $200k product six weeks earlier. I laid out
the cost of the project’s remaining six weeks for the remaining 20% of the features to be delivered, approximately $48k for a majority of some medium but mostly low business value features. When the client agreed to accept early delivery and slate the remaining work for a later release, this was a win-win. Why? The client received their product sooner and we were actually freed to take on another high-priority client sale valued at $300k for the next four weeks, as opposed to delaying or even not delivering on the original project on-time for only another $48k.

This didn’t finish 100% of the project, and while that is correct, it delivered the highest business value in the shortest amount of time. We were then able to maximize our opportunity cost by freeing up the team to focus on the next client deal with the highest business value and profit. This was definitely something that made business sense to the business executives.

V. INSTITUTING AN AGILE PORTFOLIO GOVERNANCE AGNOSTIC TO LEADERSHIP CHANGE

I have the metrics for demonstrating business value, managing opportunity costs, and ideally maximizing profits on a team-by-team and product-by-product level. Now how to take these mechanics and make them work in the type of environment I described earlier. This was especially challenging in the beginning when IT resources reported directly to the business and wasn’t necessarily seen as a respected stakeholder in the management of the business portfolio.

A large part of this story had to do with building strong relationships through consistent networking with many facets of the company. Although that isn’t the focus of this story, it is a necessary ingredient if you want reliable, frequent, and iterative feedback on the portfolio plan as a respected IT stakeholder. In beginning of instituting an agile portfolio governance process when dealing with a highly charged environment, I advocate to stay away from the agile nomenclature as much as possible. Stick to the purpose of the techniques and meetings, without using the agile jargon.

Another crucial component to understanding the portfolio management model I needed to create was in my following of Johanna Rothman and keeping her book, Manage Your Project Portfolio [3], physically on hand during my tenure at the firm. I saved myself a lot of grief by doing so.

A. The Business Case

We needed to assess all of our proposed efforts. In an informal way at first, I started my focus on one line of business (LOB). I met with the sales leads and even the business unit manager to understand their focus, strategy, and goals for the quarter/year. The remit to define the scope of work that resources dedicated to this LOB should be working on came from those discussions. This was the business case, for each client initiative that eventually resulted in projects, and they generally fell into two categories for 90% of them:

- Either to win a sale with an existing or prospective client,
- Or developing a new unproven product/service to sell in the marketplace.

Determining the first business case criteria was relatively easy once we had defined the pertinent factors, as it generally related to work that we had done before. Now a sale was a sale, and NYSE Technologies has the goal of becoming a billion dollar business. Therefore almost none of these business cases were ever denied. The only problem was scheduling them so that we didn’t strain resources and overpromise our delivery capabilities. Here’s an example of the criteria we considered for these types of business cases:

- Expected development costs – This required my teams to quickly estimate using Pete Behrens’ quick estimation technique of backlogs coupled with the team’s burn rate to arrive at the amount (the cost per point model).
- Profit Margin – This was determined sometimes between a combination of a one-time sale and/or a subscription-based costing model for the client.
- Client Desired Delivery Date
- Overall Effort – The entire backlog estimate with the number of iteration/weeks to deliver the product (development + QA +UAT + production deployment).
- IT’s Proposed Schedule Start – Determined based on our current set of priorities.
- Quarter for which the sale will close – as this sometimes determined when to schedule the work.

The second business case type was a lot more difficult to manage, as it had to do with a lot of unknown factors aside from the ones listed in the first:

- The relative risk involved in expending resources on such efforts, and the associated opportunity cost loss.
- The strategic importance of such a product to the division’s overall product/services suite.
- Identification of “Lighthouse” customers – clients willing to experiment and use the product/service as our first user group to validate the project’s direction and goals.
- The likelihood that there would be demand for such a product/service.

This last criteria was what concerned senior business management the most. No matter how many client confirmations were received, this was truly an imperfect metric. The only real issue here was reasoning with management on having the patience to alter and adapt the product/services to the real market demand as they were discovered, as opposed to abandoning the entire project because an immediate sales number was not met.
B. Getting in Front of the Right People

As the division was still in its infancy the concept of a Product Owner, or a set of them to oversee each product/service, was not understood or appreciated. The LOB business unit manager was the ultimate sponsor, along with the clients we sought to service. I made a compelling case, and used some real examples, as to why we needed to pay attention to the capacity of our teams and asked for the LOB manager and myself to initially just have a short bi-weekly meeting to review the status our projects.

At these status meetings I not only supplied burndowns for the projects, their costs/profit margins, and business value delivered to date, I also aligned the business cases of each project against one another. The comparison helped the LOB manager understand, outside of political factors, where the black and white best opportunity costs lay.

Now in the beginning I received such answers as, “we need to do it all.” My answer was almost always that we can do it all; it just means we have to decide what gets done first. Reality would soon hit that there was so much demand but finite resources. Something needed to give in terms of priorities at a portfolio level. The metrics at this point were credible to the business thanks to my teams’ experience keeping to a reliable average velocity. This created predictability. That along with the business cases and business value metrics, LOB managers were given solid measurements from which to make their opportunity costs decisions from at a portfolio level. Regardless of leadership changes, the information needed for managing the portfolio was the same.

The senior managers attended each of these unnamed “portfolio” meetings. They kept these meetings on their calendars and eventually invited other managers.

C. Tying Up Loose Ends

Now the business cases didn’t eliminate the embellishments sometimes made by the sales teams. Nor did the selling of vaporware to clients help, since these were features yet to be delivered and even determined if they were feasible.

I addressed these issues in two ways.

1. Eventually convinced the LOB managers to have standing reviews with the sponsors of these business cases, mostly sales leads, and the stakeholders for the particular LOB. This would help to mitigate the embellishments and create an inherit escalation path by having the right players in the room.

2. I encouraged a tech representative to accompany the sales teams on some of their major client visits. This was to keep a sanity check on the discussions and at least be a voice to politely encourage a “takeaway”, like looking into the feasibility of a request, from the meeting to get back to the client on without overpromising.

D. Maturing & Evolving

Over the latter part of my tenure at NYSE Technologies the business organization was maturing. Technology resources did eventually report into the CIO’s organization, where common synergies from the rest of the organization were leveraged. The business eventually got wise to the idea of establishing a “Product Ownership” team of product owners for the different lines of businesses. They met regularly and worked in tandem with the sales and tech leads. This team helped establish the strategic direction of the organization’s products and services. Unfortunately three issues kept things from maturing to the desired level I was seeking for the organization:

1. The product owners were all business players with no understanding, or a very junior level, of what it really meant to be a product owner in the sense that technology needed them to perform that role.

2. The organization kept going through a leadership change every three-to-four months that stymied the product ownership teams’ focus.

3. The division was very much interested in pursuing further their deal with the Irish government in building up their Belfast technology resources. Letting go or relocating existing IT personnel to Ireland. This further removed much of the business leadership, product ownership, from being collocated with technology and the distance only strained the efficiencies even further. This hurdle could have been mitigated had our product owners have at least the needed experience, coaching, and training.

VI. NYSE & THE FINANCIAL INDUSTRY TODAY

After the failed Deutsche Boerse deal and lower trading volume in 2011 and 2012, the NYSE Technologies division has become an even more important strategy to the firm. Morningstar reports that, “In our view, a thicker book of business in technology services may provide NYSE with a revenue stream that is stickier and less volatile. NYSE officials have set a goal to boost revenue from information services and technology solutions--one of the company's three business segments--to $1 billion by 2015[3].” To stay on track in meeting that goal there needs to be continued commitment to their maturation in product ownership and agile portfolio management sin political factors.

As I moved on from NYSE Euronext in 2011 and continue to collaborate with my other finance colleagues, the concepts and practices we experimented with are being shared and adopted, albeit slowly, in the finance industry with tangible results. Converting more and more senior managers in
finance to its effectiveness in helping to realize business value and manage opportunity costs.

VII. REFERENCES

