
Risk Management: The Pros And Cons Of Building Your Own System

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Risk Management is in vogue these days. The crisis of 2007-2008 has in many ways been blamed on the failure of risk managers to predict the stress that we have all now lived through. With global markets rebounding and hedge funds posting positive results, the discussions about improving risk management policies and systems are taking place at many hedge funds.

Effective risk management requires that the firms establish culture, policies and procedures that are specific to their operating model. However, at its core risk management is a quantitative discipline that requires significant investment in data, systems and people. In this article we discuss what it takes to develop internal risk management architecture.

Necessary Tools

Since risk management is a quantitative discipline, the first step in developing risk management infrastructure is the development of a repository to house four types of data:

1. Holding and trade level data
2. Historical pricing data for securities traded by the fund
3. Historical data for risk factors used in various analyses
4. Results of risk management analyses

It's been a long term practice in the financial services to use Microsoft Excel as a tool for both storing data and performing analysis. The growing complexity of financial products and the need to have robust systems make Excel spreadsheets a less than ideal environment to store data. To be truly reliable, the data used in risk management analysis should be housed in a relational database such as a MS SQL Server or Oracle.

Once the data repository is built, tools to analyze the data need to be put in place.

The exact set of tools depends on a hedge fund's strategy, range of securities traded, liquidity and other factors. There are, however, some tools that are likely to be used across all hedge funds.

- Value at Risk (VaR) – Perhaps no other tool received as much criticism and blame for the current crisis as VaR. While VaR has many well documented shortcomings, it's likely to remain an important part of a risk manager's toolbox. VaR provides risk managers (and their bosses) with a quick read of the hedge fund's risks.
- Stress Tests – Scenario analysis based on either historical stress events or theoretical scenarios can be used to complement VaR analysis.
- Greeks – Various sensitivity measures such as Option Delta, Gamma and others provide important information about the fund's exposure to different market factors.
- Factor Analysis – Factor analysis can be used to uncover potential hidden tilts in the fund's portfolio. ▶

Risk management systems should be able to perform the above analysis and provide clear and consistent reporting mechanisms so the output of the analysis can be used by risk managers, traders and a fund's investors.

Build vs. Buy

Whenever new systems need to be put in place, the usual question of *build versus buy* arises. There may be many factors that affect the ultimate decision to build or buy a system. Though price is often an important criterion, it should not be the deciding factor. There are many instances when a hedge fund should opt for a buy decision and avoid spending time and resources on internal development. The buy decision is usually justified when implementing systems that aren't specific or critical to the hedge fund's core strategy. Such systems usually include: contact management, accounting, trade capture and others.

The decision to buy or build a risk management system depends on the complexity of the hedge fund's strategy and the variety of products traded. Most commercially available systems may be sufficient to analyze a certain range of products. Few systems are able to produce meaningful analysis of a diversified and complex portfolio. Even fewer do it well.

If anything can be learned from the current crisis it is that risk management needs to be part of a core strategy of any investment firm. What this means is that risk management systems need to be part of the core strength of any hedge fund that wants to stand out. For such hedge funds, buying an off-the-shelf product may be a first step in

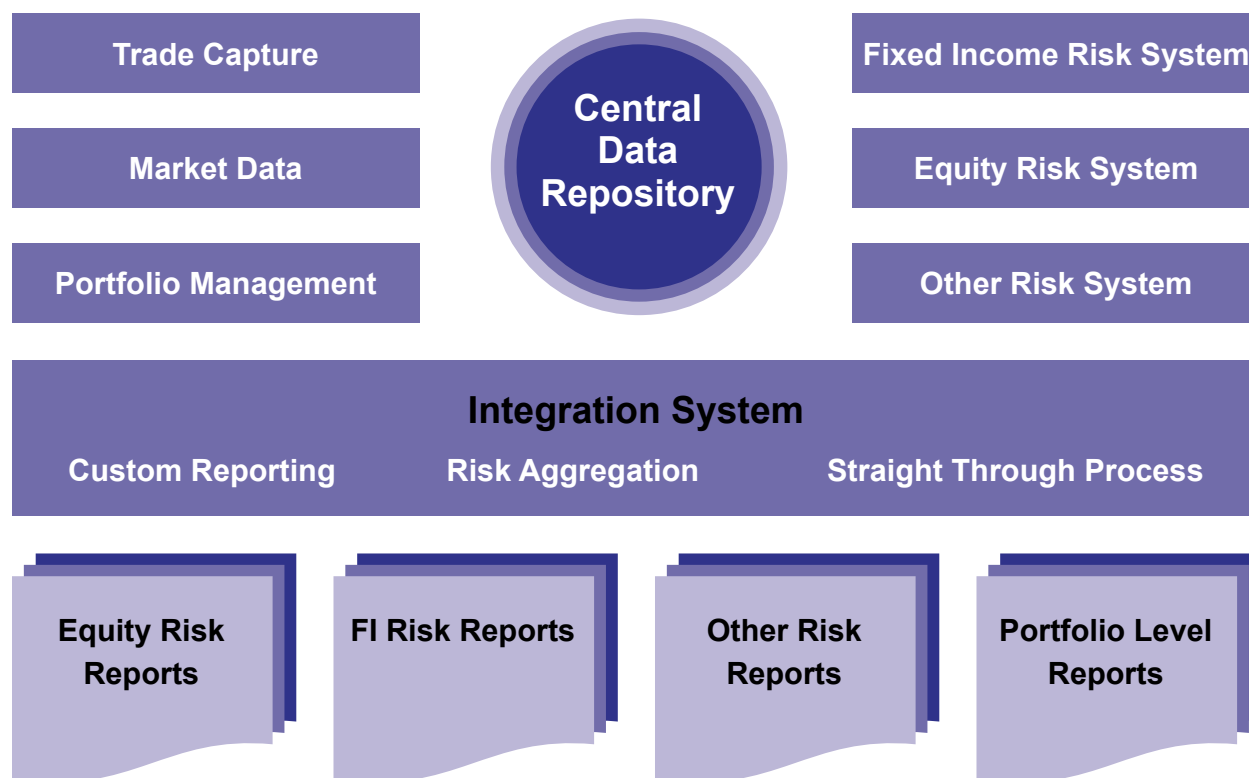
developing risk management architecture, but it shouldn't be the only step.

Ultimately, all commercial packages are made to be able to satisfy the largest number of customers. Some packages can be customized to each client's needs, but the customization effort may be complex, limited in scope and expensive. We have seen such implementation at a number of hedge funds. The usual architecture involves a vendor risk management package such as Risk Metrics, MeasureRisk or others. Any risk management system (vendor or in-house) needs to be integrated with trade capture, portfolio management, and back office systems.

Depending on the complexity of the fund's portfolio, the vendor system may not be capable of handling certain instruments. In such situations, the solution may involve either building an internal system to handle these instruments or purchasing an additional vendor system(s). We, in fact, have seen multi-strategy hedge funds purchase one system to handle equity products, a second system to handle fixed income, and a third system to handle exotic products. Ultimately, all these systems need to work together.

While ensuring seamless dataflow and building custom reporting that integrates all the systems is a big task in itself, there is an even a bigger issue. At the end of the day, a risk manager needs to have a complete picture of portfolio exposures. Such a picture needs to incorporate correlations among various products that exist in disparate systems. Building a tool to bring all these exposures together is akin to developing a complete risk system from scratch. ►

A typical risk management infrastructure at a multi-strategy hedge fund



For a fund that has decided to dedicate time and resources to develop its own risk management system, the decision of whether to hire full-time personnel or to outsource the development needs to be made.

Developing a risk management system is not a trivial process and is likely to take significant time and money. Human resources required to implement such a project typically require at least two, and likely more, highly-skilled professionals with graduate or post-graduate degrees and extensive software skills. Even in the stressed employment markets that we are experiencing right now, such individuals carry an expensive price tag. Hiring several such individuals may not justify the value added by the development. Addi-

tionally, a proper enterprise-level development effort will require investment into project management, quality assurance and maintenance practices, all of which will call for extra hires. The solution to this may lie in outsourcing a significant part of such development to a firm specializing in such projects.

The in-house vs. outsource decision does not need to (and perhaps shouldn't) be mutually exclusive. In order to extract the full benefit from the custom developed system, the fund should employ at least one of those highly-skilled risk professionals capable of modifying and maintaining the system. Having an outside vendor perform most of the development would ensure faster implementation. ►