The Evolution of Risk Technology
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Financial institutions have a complex relationship with technology. They need to constantly remain at the cutting edge of innovation to maintain competitive advantage, yet at the same time, investing in IT can also have unintended consequences and may involve multiple barriers towards benefit realization. Architectures can become unwieldy and overly complex, impeding a firm’s ability to implement effective change. The external pressures of the regulatory agenda are the primary driver for current IT expenditure. This leaves far less discretionary funding for investment in new technologies that could create future competitive advantage.

As financial institutions develop their infrastructure, they must carefully manage the trade-offs between the benefits of successful technology innovation and the inherent risks. There is no such thing as a perfect or risk free technological solution – each comes with its own set of challenges. Technological evolution, much like its biological counterpart, is not a static or predictable process.

In this article, based on analysis by Accenture and Chartis, we assess the role of technology in financial institutions as both a tool for managing risk, and as a source of risk in its own right. We have focused on seven specific technology areas, which have been identified by Accenture and Chartis as having significant current or potential influence on enterprise risk management (ERM):

1. **Mobile technology**, such as tablet computing, mobile communications, hand-held devices, etc.
2. **Cloud computing**, such as the use of virtual servers available over the internet, including but not limited to Software as a Service (SaaS)
3. **Social media**, e.g., social media data and/or analytics
4. **Artificial intelligence**, e.g., natural language processing, neural networks, machine learning
5. **Big Data**, i.e., the use of advanced analytical tools and techniques that process extremely large varieties and quantities of data at high velocity
6. **Real-time and high-performance computing**, e.g., very large-scale simulations using in-memory analytics, supercomputers, instant messaging, complex-event processing
7. **Open-source software**, including open-source content

**Survey demographics**

The findings from The Evolution of Risk Technology¹ are based on a combination of survey and interviews with 262 risk, compliance and technology professionals:

- 40% of the surveyed respondents were from North America, 30% were from Europe, 16% were from the Asia Pacific region, and 14% were from the rest of the world.
- 49% of respondents came from firms with revenues of less than $500m, 40% from firms with revenues between $500m and $30bn, and 11% from firms with revenues of more than $30bn.
- 80% of respondents were from the financial services industry, with a balanced distribution across banking, capital markets, and insurance.

Government, regulators, and respondents from the manufacturing and professional services sectors represented most of the non-financial respondents.

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Key research findings

Technology is both a key source of reputational risk and a tool for managing it effectively

Reputational risk management remains a top priority for the industry. In interviews conducted for this document, it was consistently cited as one of the greatest threats facing financial institutions. Reputational risk is unique because it represents a consequence of failures in other aspects of risk management, which is one reason why firms find it so difficult to manage. In the Accenture 2013 Global Risk Management Study, “Risk management for an era of greater uncertainty”, respondents highlighted reputational risk as the risk-related business goal with the second largest gap between the importance of achieving the goal and the availability of risk capabilities to do so (Figure 1). In other words, while the importance of reputational risk is gaining in recognition and focus, many financial institutions are finding it hard to manage effectively.

The explosion in information technology has been a key contributor to the complexity of managing the reputational risk environment. Among the technology types studied by Accenture and Chartis, social media emerges as the number one potential source of risk, according to respondents (Figure 2). Many firms are concerned about the role that social media can play as a channel for communicating information about loss events and risk management failures to the outside world. In many ways, it represents a “third dimension” of risk for stakeholders. As well as looking at impact and likelihood, companies now need to consider velocity. An incident that may once have taken many weeks to become widely known – or may never have become public at all – can now be shared across major social media networks in a matter of seconds.

Social media can also be a tool for conducting financial crime. In recent years, there have been numerous social media scams, in which major social media websites have been used to steal identities. Fraudsters have also used spambots to post false information about a company within the social media sphere, which can adversely affect the company’s reputation and stock prices. By shorting the company’s shares, the fraudsters are able to profit from the speed with which this false information is shared. At the customer level, social engineering has been utilized by fraudsters (e.g., phishing for personal information).

At the same time, new technologies can be powerful enablers of reputational risk management. Social media, again, is considered to be particularly powerful in this respect (Figure 3). Some of the firms interviewed as part of the research are planning to use cognitive analysis, computational techniques such as data and text mining, and sentiment studies to help them identify sources of risk. They are also exploring Data as a Service (DaaS), such as social media monitoring, to analyze their social media benefits and risks. This platform-agnostic external data analysis allows for vendors to separate out their data cost and usage from a specific software or platform, which is important for compartmentalized IT budgets. Key vendors in this space include ICBA, Temenos, and Sentiment Metrics.

“Ultimately, our whole business model is based on trust – reputational risk is therefore a higher order risk type and closely linked to trust. We continue to investigate and learn about new methodologies and techniques for reputational risk management. I envisage that in the coming years we will be using a combination of open-source content, social media analytics, and AI tools to monitor and manage reputation risk for our bank.”

COO of a regional US Bank
Figure 2. Technology types as sources of risk
To what extent does your organization consider the following technology types a source of risk? (Average response, from 1-4, where 1 = not important and 4 = very important)


Figure 3. Social media as an enabler of reputational risk management for given risk types
How important is social media (e.g., social media data and/or analytics) to the organization as support for managing the following risk types? (Average response, from 1-4, where 1 = not important and 4 = very important)

Firms are also using analysis of historical data to determine relevant KPIs/KRIs, breaking these down to a granular level, and implementing early warning systems and controls. Banks and insurers have long used social networking analysis technology within their own datasets to combat fraud, such as insurance claims fraud or 'bust-out' frauds in banking. In the future, we envisage that this technology will be extended to include external data found in social media/networking sites. This can be combined with device-ID technology to tackle fraud threats.

This fraud affects three parties: the financial institution; the customer; and the social media company. To make best use of these technologies, financial institutions can collaborate with the social media companies to protect their customers, recognizing social media as a source of risk, a communications medium for reputational risk, and an enabler for risk management.

### Interconnectivity in risk technology

Many of the technology types studied in this report are closely connected with each other. Social media is part of cloud computing, which is closely linked to mobile technology. The confluence for these technologies is Big Data, which represents a hub and analysis point for the data produced by these technologies (Figure 4).

This interconnectivity can affect how firms make investments in risk technology. According to the results of the research¹, in some cases there is a strong correlation between investment in one technology and investment in another, whereas in other cases that link is significantly weaker. Table 1 shows the correlations between levels of investment by different technology types.

For example, the research¹ shows that there is a relatively high correlation between investments in social media and mobile technologies among the respondents. This linkage is intuitive as mobile is increasingly the preferred channel for consuming social media.

There was also a notably low investment correlation between social media and Big Data and real-time technologies among the respondents. These are key elements of effective social media management: at root, social media comprises large quantities of unstructured data, in real-time. One explanation for this could be that financial institutions trail the retail sector in gaining value from Big Data/social media solutions, as the perceived risks and compliance challenges of these new channels and proliferating customer communications can be a barrier to adoption within the financial services industry.

### Firms have invested most in real-time technology and in Big Data, with larger firms proportionally investing more in these technologies

Out of the seven technology types studied by Accenture and Chartis, firms are most likely to have implemented real-time and high-performance computing for managing risk (Figure 5). Financial institutions are using these technologies across areas such as real-time or near-real-time fraud detection (e.g., credit/debit card fraud), real-time credit scoring, real-time transaction monitoring for trade surveillance (e.g., rogue trader detection), and high-frequency trading. While overall levels of adoption are currently low, the majority of firms have some form of implementation plan in place, meaning that there remains a significant opportunity for these technologies to penetrate the risk management marketplace.
Table 1. Investment in risk technology – correlation between technology types

<table>
<thead>
<tr>
<th></th>
<th>Mobile technology</th>
<th>Cloud computing</th>
<th>Social media</th>
<th>Artificial intelligence</th>
<th>Big Data</th>
<th>Real-time and high-performance computing</th>
<th>Open-source software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile technology</td>
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<td>High</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td>Cloud computing</td>
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<td>Low</td>
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<td>Social media</td>
<td>High</td>
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<td>Artificial intelligence</td>
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<tr>
<td>Big Data</td>
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<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Real-time and high-performance computing</td>
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<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Open-source software</td>
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<td>Medium</td>
<td>Low</td>
<td>Medium</td>
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<td>Medium</td>
</tr>
</tbody>
</table>


Figure 5. Investment pattern among technology types

Is the organization planning to utilize a given technology type for managing risk?

We also found that investment in these technologies is highly correlated with investment in Big Data (Table 1). To parse huge datasets with sufficient speed, firms need to consider investing in high-performance computing, so that models can be updated quickly enough to take advantage of the dynamic nature of the source data. In our view, risk functions increasingly want dashboards that provide information on group-level and end-of-day exposures across the full credit portfolio.

The research found that levels of investment in these technologies vary according to the size of the institution. Although firms with revenues of more than $30bn have invested proportionally more of their budgets across all technology types than smaller firms have, the gap is largest with Big Data, real-time and high-performance computing, and artificial intelligence (AI) (Figure 6). Follow-up interviews revealed that larger firms are already applying advanced AI tools to fields including fraud detection, credit scoring, and trading risk analytics. The benefits from these initiatives are being used to justify the business case for further investments.

The study identified that the gap in the level of investment is smaller for other technology types, such as cloud computing and open-source software. Cost is a key factor here, as smaller firms often do not have the resources to invest in costly in-house IT infrastructure and will prioritize solutions, like cloud and open-source software, where the value proposition is more attractive.

Externally hosted or SaaS solutions have become prevalent among smaller and medium-sized financial institutions over the past few years, particularly in capital markets for areas such as market risk analytics and portfolio risk management. These hosted solutions are increasingly used to tackle additional risk and compliance areas such as operational risk, enterprise fraud, counterparty risk, and customer on-boarding.

Within larger firms, our observation is that the move is towards a system of pilot-based innovation, where the costs and benefits of a given technology type can be effectively managed during a “test-run” of the technology within the firm’s infrastructure.

Our interviews suggested that smaller firms are more compelled to “take the plunge” when implementing. While potentially high-risk, this method can be much faster to implement, and the early adoption of innovative risk technology can represent a significant competitive advantage for smaller firms.

“I can access risk information from a dashboard on a tablet computer and drill down in real-time into individual exposures, down to the transaction level. This same dashboard can also be used for monthly discussions with regulators.”

Chief Risk Officer (CRO) for a top 10 global bank

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**Figure 6. Investment in technology by company size**

*Investment by technology type, comparing larger (> $30 billion in revenues) with smaller (< $30 billion in revenues) firms, average response, where 1 = not invested and 4 = very invested*

<table>
<thead>
<tr>
<th>Technology Type</th>
<th>Over $30 billion</th>
<th>Under $30 billion</th>
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<tbody>
<tr>
<td>Real-time and high-performance computing</td>
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<td>Big Data</td>
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<td>Mobile technology</td>
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<td>Cloud computing</td>
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<td>Social media</td>
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<td>Open-source software</td>
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<tr>
<td>Artificial intelligence</td>
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Signal vs. noise

Our research\textsuperscript{1} revealed that the analysis of unstructured data can be a key enabler of disciplines such as reputational risk management, systemic risk, credit risk, and operational risk assessment. Most post-loss event analysis reveals early warning indicators hidden in unstructured data (e.g., e-mails, voice recordings). By mining this data proactively and identifying potential risks, firms can take the necessary preventative risk mitigation action. The problem is that financial institutions cannot afford to capture all data from all sources and compute all scenarios. The size of the datasets involved makes it extremely difficult to separate the signal from noise and distinguish between a true positive and a false positive. Equally, retroactive elimination of false positives or data perceived to be meaningless may result in the elimination of information that could prove useful at a later point.

Effective risk management requires focus and the ability to separate the signal from the noise by identifying the right scenarios, in order to prevent them or prepare for them. Technologies such as AI and advanced analytics are playing a key role in enabling this, by helping companies to automate the process and help ensure that they are monitoring the most relevant scenarios and indicators.

Artificial intelligence has the highest rate of future adoption

The research\textsuperscript{1} examined both current adoption of technologies and expected levels of future adoption. By comparing these two metrics, we see not only the maturity of certain technologies, but also the extent to which firms expect to prioritize them.

Out of the seven technology types studied, the response indicated that artificial intelligence has the highest rate of future adoption. The number of respondents who say they plan to adopt these technologies in the future is more than twice that of those that have already done so (Figure 7).

Financial institutions, as well as critical government and infrastructure respondent entities (e.g., defense, air transport, energy and utilities), are prioritizing AI for a number of reasons such as unmanned vehicle management, air traffic control, and energy resource management. Many see it as a key weapon in the fight against financial crime, such as fraud and anti-money laundering. Firms are also applying AI tools and techniques to detect and prevent cyber attacks, which are a key area of concern for respondents. Cyber threats are becoming more sophisticated and fraud detection and security infrastructures need to be able to deal with complex threats within increasingly complex, siloed banking structures. Other risk management applications of AI include the analysis of credit risk by leveraging non-traditional data sources such as social media and the management of investment risk through the use of web-based unstructured sources to develop trading strategies.

The rate of AI adoption reflects the growing automation of the risk function. There is, however, a limit to the role that technology can play in supporting risk management. Although it can play an important role, it cannot replace human judgment and experience. In “How to wage the war for big data analytics talent”, Accenture noted that there is an increasing demand for analysts and data scientists within financial services. Institutions are looking not only for quantitative analysis, but also for “fact-based insights that can complement [executives’] experience and instincts.”

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{chart7.png}
\caption{Rate of adoption (ratio of future implementation to current implementation) for given technology types}
\label{fig:chart7}
\end{figure}
We have created a new business unit called the Financial Intelligence Unit. The focus of this unit is to create a multi-disciplinary team of risk and finance practitioners and computer and data scientists, as well as front-line business experts to develop new and innovative technology-based solutions to tackle financial crime, enterprise risk, and reputational risk.

We are currently working with [a third party risk technology vendor] to use artificial intelligence tools, including link analysis and machine-learning tools. We are currently in a PoC (proof-of-concept) stage, but we have already identified a number of previously hidden risk exposures. This identification and subsequent prevention have already saved the bank $25m, ten times the cost of the PoC.

CRO of Top 20 Global Bank

While the benefits outweigh the risks, there is no accord on IT risk

Although all technology types covered by this research can act as sources of risk, as well as helping to manage it, the consensus among respondents is that the benefits outweigh the risks (Figure 8). In particular, Big Data, real-time technology, and mobile technology were seen as having benefits that significantly outweighed their risks.

There is, however, little consensus over who in the organization should be responsible for managing IT risks. A large proportion of surveyed firms say that a mix of C-level executives and other business leaders are responsible for managing IT risks in their business, as opposed to a dedicated role such as a Chief Risk Officer (CRO) or Chief Information Officer (CIO). Technology risk is traditionally a subset of operational risk, but as these technologies become increasingly pervasive, they are crossing traditional definitions and boundaries and moving outside the traditional coverage of the risk function.

Our follow-up interviews also revealed the growing importance of the Chief Data Officer (CDO) in relation to risk technology. Data availability, consistency, and integration play a pivotal role in risk technology implementation.

Without clear accountability for a particular technology risk type, there is a danger that it will fall through the cracks. It will often be assigned to IT security and compliance departments. These teams can often apply a risk-averse approach, inhibiting further innovations to reduce short-term costs within the firm and blunting the firm’s technological edge in the future.

Therefore, while risk technology continues to evolve, appropriate governance and lines of responsibility remain essential to successful ERM.

“While the benefits outweigh the risks, there is no accord on IT risk.”

CRO of Top 20 Global Bank

Figure 8. Risk vs. benefits of technology types
(Average response, where 1 = risks significantly outweigh benefits and 4 = benefits significantly outweigh risks)

About the Authors

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Steve is the global managing director of Accenture Finance & Risk Services. Based in London, Steve has more than 20 years of global experience in strategy definition, risk management, enterprise performance management, and delivering large-scale finance operations engagements. Prior to his current role, Steve was the global lead for Accenture’s Finance & Performance Management consulting services for global banking, insurance, and capital markets institutions. With his extensive risk management and performance management experience and business acumen, Steve guides executives and their teams on the journey to becoming high-performance businesses.

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Ian is a managing director – Accenture Finance & Risk Services. He is the Technology lead for this group and is based in London. He is specialized in large scale Finance and Risk transformation projects and has been with Accenture for more than 10 years. Leading high impact transformation engagements across the financial services industry, Ian helps clients perform evolutionary transformations to reduce cost, complexity and drive value through the adoption of enterprise class applications and technologies.

References


Narendra Mulani and Nick Millman, How to wage the war for big data analytics talent, December 2012, Accenture

Notes


About Chartis Research

Accenture Risk Management was the Research Partner for the eigth edition of Chartis Research’s 2013 RiskTech 100 Report, where this content was also published. The RiskTech100® is recognized globally as the most comprehensive and prestigious study of the top technology companies active in the risk management market.

Chartis is the leading provider of research and analysis for risk management technology. Their goal is to help clients make informed technology and business decisions by providing in-depth analysis and actionable advice on the broad spectrum of risk technology offerings.

Visit www.chartis-research.com to download the Chartis Research’s RiskTech 100 Report.

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