

# **Aligning Risk and Finance in Banks: From Theory to Practice**

## About Chartis Research

Chartis is a leading provider of research and analysis covering the global market for risk management technology. Our goal is to support enterprises seeking to optimize business performance through better risk management, corporate governance and compliance. We help clients make informed technology and business decisions by providing in-depth analysis and actionable advice on the broad spectrum of risk technology offerings. Areas of expertise include:

- Credit risk
- Operational risk and Governance, Risk and Compliance (GRC)
- Market risk
- Asset and Liability Management (ALM) and Liquidity Risk
- Financial Crime
- Insurance risk
- Regulatory requirements including Basel 2, Basel 3, Dodd-Frank and Solvency 2

Chartis is solely focused on risk technology giving it significant advantage over generic market analysts.

Chartis has brought together a leading team of analysts and advisors from the risk management and financial services industries. This team has hands-on experience of implementing and developing risk management systems and programs for Fortune 500 companies and leading consulting houses.

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# 1- Executive summary

For many years, banks have considered pursuing a greater alignment and integration of their risk and finance functions, often encouraged by regulators, consultants, and shareholders. However, projects to reach this goal inevitably fell short and were abandoned because of a lack of commitment or substantial barriers that made the benefits not worth the cost.

The financial crisis has changed the way that banks look at risk and finance integration, and these projects have once again been prioritized. However, the path to successful risk and finance integration is not at all simple. If it were, firms would have already done it. Banks face a number of technology and organizational challenges and business model changes.

To understand the problems that banks are facing, their aims for risk and finance integration, and their technology needs, SAP commissioned Chartis Research to carry out a survey of risk and finance professionals on this subject. The survey and analysis was carried out independently by Chartis Research.

The results show that:

- 88% of the 108 respondents said that risk and finance integration was a top priority or an important priority for them
- 67% intend to implement, or have already begun to implement, integrated risk and finance at an enterprise level
- Only 8% have not begun risk and finance integration projects
- Regulatory requirements, including Basel 3 and IFRS, and cost concerns are key drivers for firms to improve or implement risk and finance integration projects
- Over half of the respondents considered compliance with domestic and international regulations (such as Basel 3, EMIR, and IFRS) and business performance to be the two main shapers of approaches to integration
- Improved decision-making and capital allocation were the top two strategic goals to be achieved by integration projects. Stress testing and improved P&L forecasting are seen as key benefits resulting from these strategic goals
- Diverging priorities of risk and finance and the disconnect between the front and back office are the most significant organizational barriers to aligning the risk and finance teams
- Data quality, data volume, and siloed data are the most significant technology barriers to the success of on-demand risk and finance analysis. The survey shows that improving data quality and reconciliation is the number one technology goal for banks implementing risk and finance integration
- The technologies seen as having the greatest value are unified and open data models
- In follow-up interviews (see below), respondents suggested that they thought that new technology systems would not remain cutting edge for long and would need to be replaced fairly soon after implementation, demonstrating the need for solutions that can evolve with the bank, rather than point solutions
- For 62% of respondents, funding for risk and finance integration projects comes from change or special programs budgets, which show that budgets are being set aside for integration projects and that banks recognize the need for change programs.

To supplement the quantitative results of this global survey of 108 practitioners and to learn about banks' approaches to risk and finance in greater detail, Chartis also carried out 25 in-depth phone interviews and face-to-face meetings with senior figures from banks and consulting firms. This report covers the results of Chartis's survey in more detail and uses the results and interviews to explore the best methods for firms to implement risk and finance integration.

## 2- Key findings

To find out how far banks have advanced risk and finance integration projects and what challenges they face with regards to risk and finance, Chartis Research carried out a quantitative global survey of 108 practitioners working in the banks around the world. The aim of this research is to see how risk and finance challenges are affecting different banks depending on their size, location, and goals.

The primary findings from the survey indicated that most respondents had not yet completed risk and finance integration projects, but had plans or motivation to do so. A wide variety of goals were considered to be achievable via integration, and data management and data quality viewed as both a major goal and challenge from the technological viewpoint.

### 2.1 Priorities and goals

One of the first and most important findings is how important banks consider risk and finance integration to be. Very few respondents believed that their organizations were integrated, and, at the other end of the scale, less than 10% of respondents thought that risk and finance integration was not a priority, as Figure 1 shows. 88% of respondents believe risk and finance integration is a top or important priority and intend to do something about it.

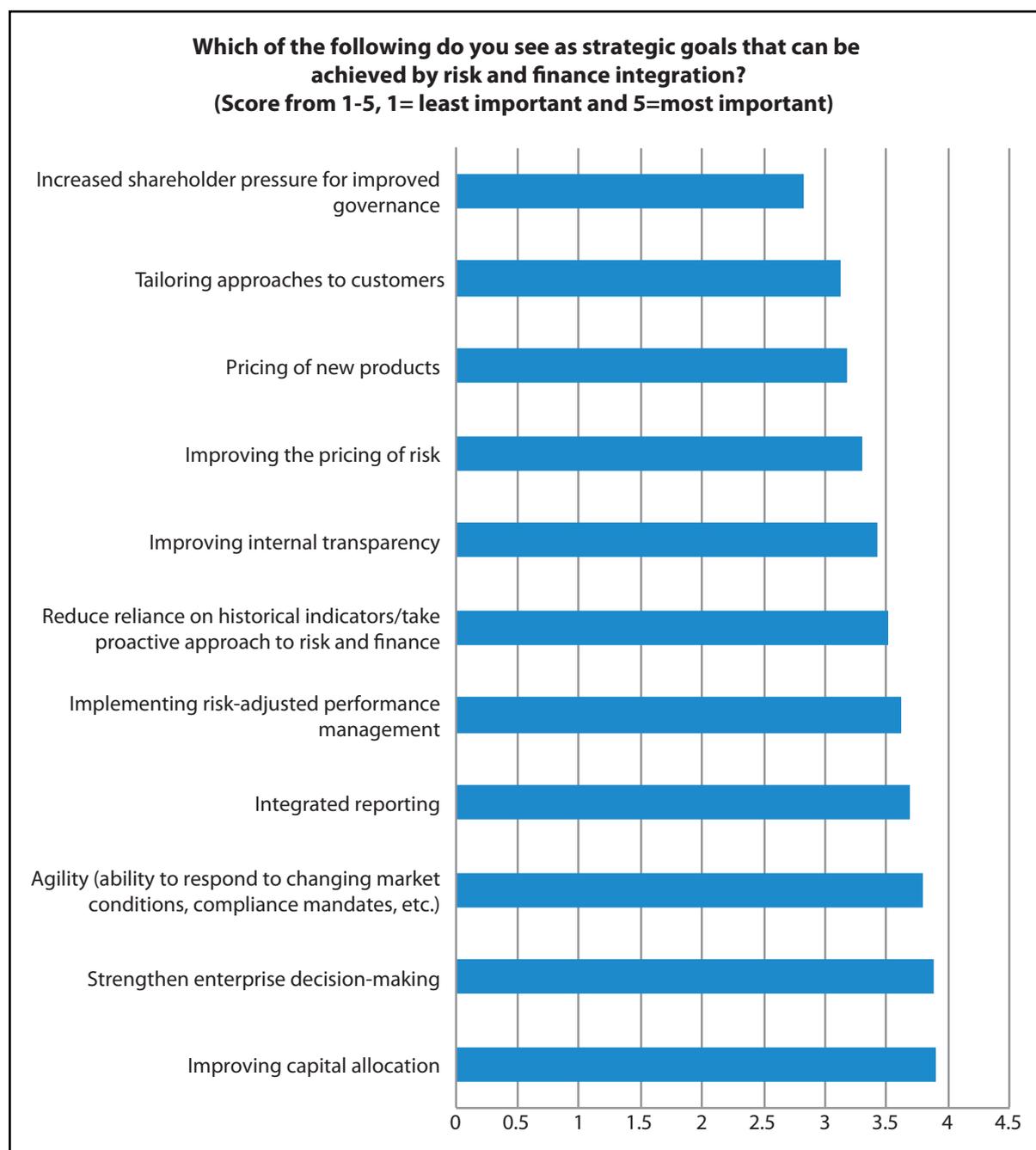
**Figure 1: Risk and finance as a priority**



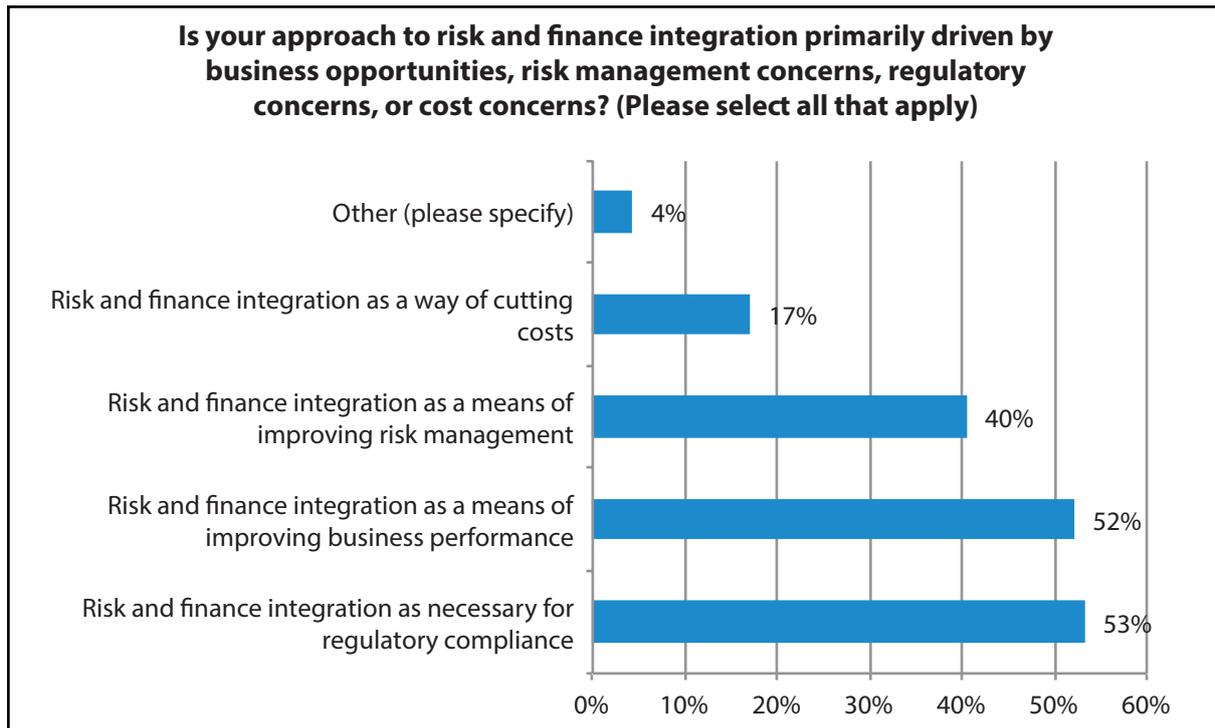
Examining the goals valued and considered possible by banks, the survey found that banks had a variety of goals and methods, with no clear front-runners. This reflects a widely-held belief in the flexibility and overall practicality of risk and finance integration. Figure 2 shows the strategic goals that banks wish to achieve through risk and finance integration and Figure 3 what business concerns are driving respondents' integration projects.

As Figure 2 shows, the responses indicate a stable, industry-wide attitude that risk and finance integration can achieve results across a wide variety of undertakings, as many goals were seen as of similar importance. However, the highest-rated goals were improving capital allocation, agility, integrated reporting, risk-adjusted performance management, and enterprise decision-making. These results were backed up by Chartis's in-depth interviews, in which respondents said that capital management and optimizing returns on capital were key areas of overlap. Interviewees noted that in these areas, the risk and finance function had often previously performed different tasks, but without overall alignment between the two, something that risk and finance integration projects aimed to correct. These results are also explained by a number of respondents noting the need to comply with new regulations, which was driving their ambitions to improve reporting and asset management. The lowest rated goal was alleviating increased shareholder pressure for improved governance, followed by improving risk pricing and tailoring approaches to customers.

**Figure 2: Strategic goals to be achieved by risk and finance integration**



**Figure 3: Drivers for risk and finance integration**

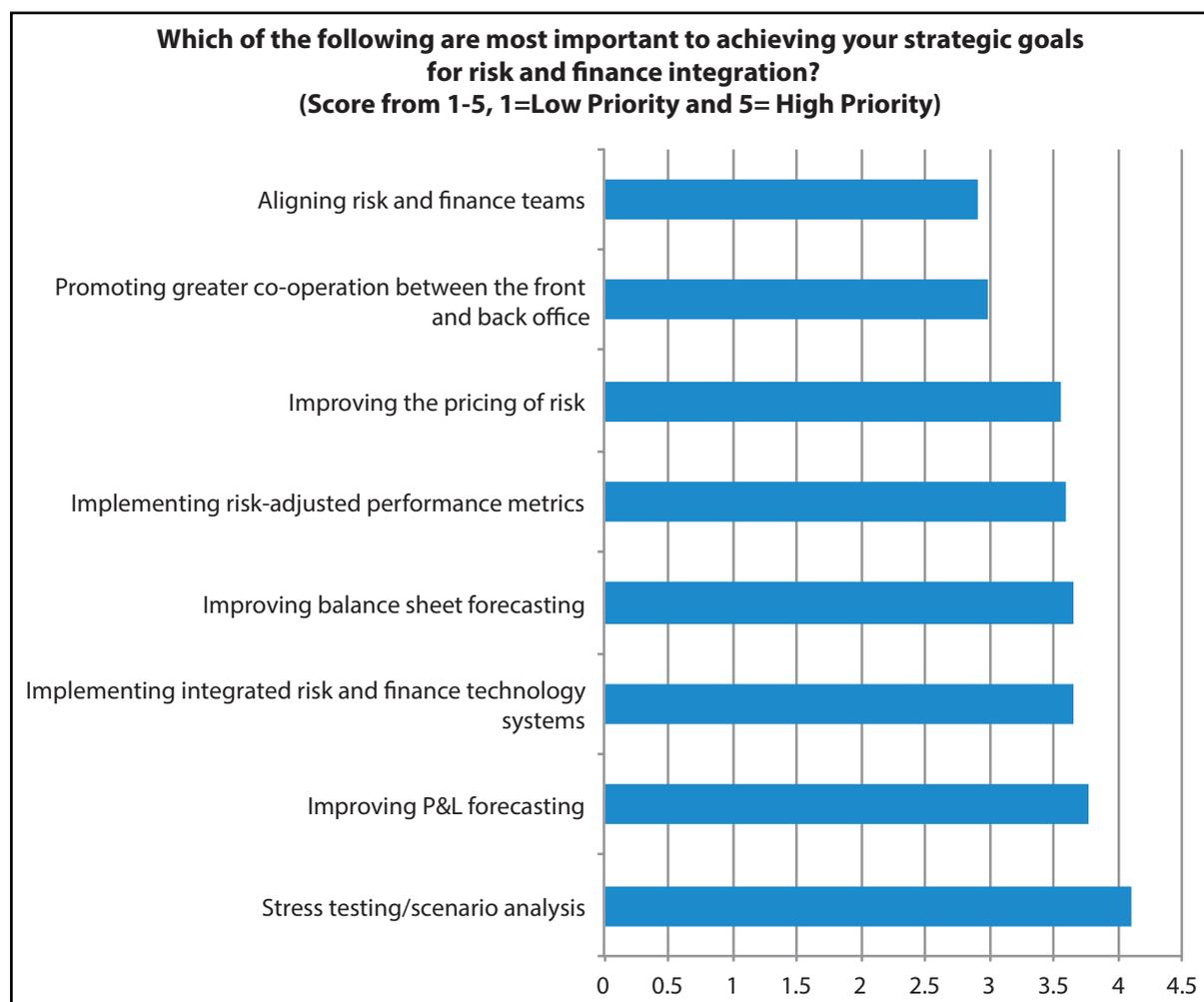


Over half of the respondents considered regulatory compliance and business performance to be priorities, with regulatory compliance being the primary driver for 53% of respondents. Improving risk management in and of itself was not considered to be a lesser priority, and only 17% indicated that cutting costs was a primary driver, although this could be considered to be a part of improving business performance.

There was a consistency in responses for how to achieve these goals, as Figure 4 shows. Scenario analysis and stress testing was considered most important, followed by improved P&L and balance sheet forecasting, integrating risk and finance technology systems, and implementing risk-adjusted performance metrics. The follow-up interviews supported this, with interviewees from banks arguing that, due to increased regulation and increased internal demand, stress testing needs to become a core discipline in the bank and, because of its use in numerous areas, including risk appetite, capital planning, and economic capital, this will be greatly aided by the alignment of risk and finance.

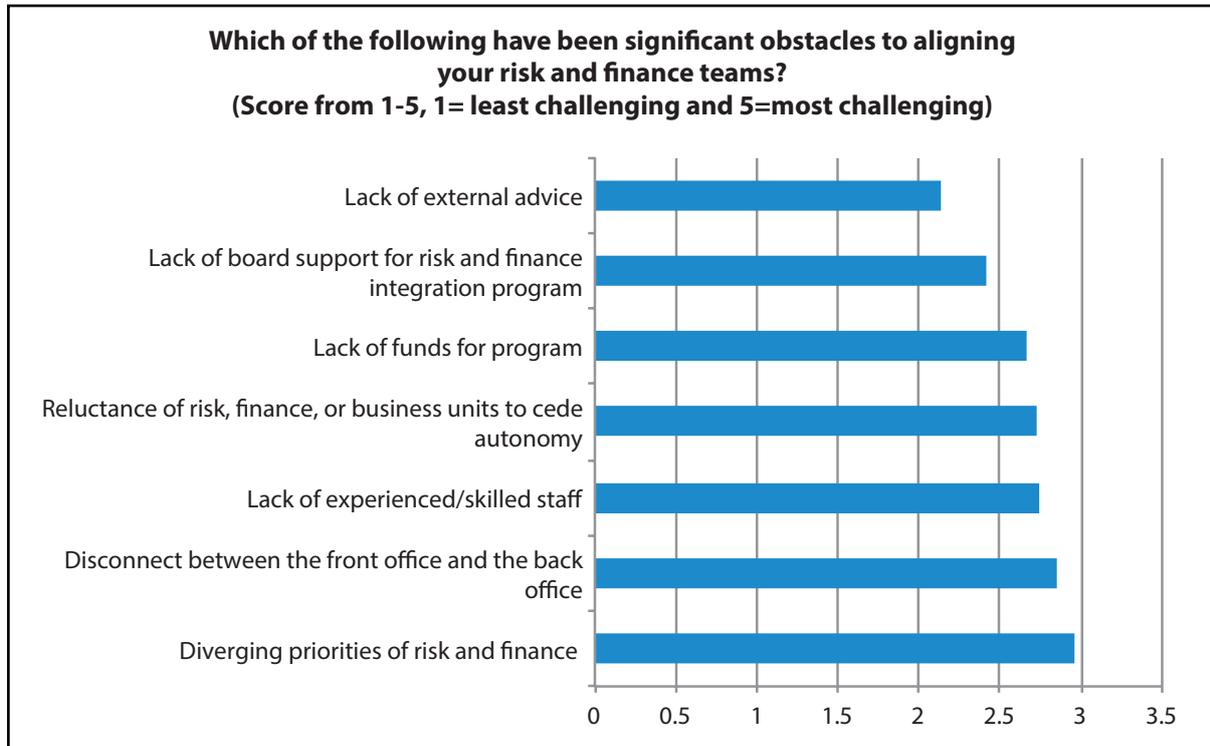
The lowest scores were those promoting greater co-operation between the front and back office, and aligning risk and finance teams. These are more human resources and culture-based issues than technological ones. This may be because cultural problems are considered to be more nebulous and harder to fix, or because they provide questionable economic feedback.

**Figure 4: Achieving goals for risk and finance integration**



With regards to the obstacles to aligning risk and finance, cultural issues were considered to be major barriers. The most stressed obstacle was the diverging priorities of risk and finance, with the disconnect between the front and back office and a reluctance of functions to cede autonomy following closely behind. Lack of external advice was the obstacle that surveyed respondents suffered from the least, followed by lack of board support.

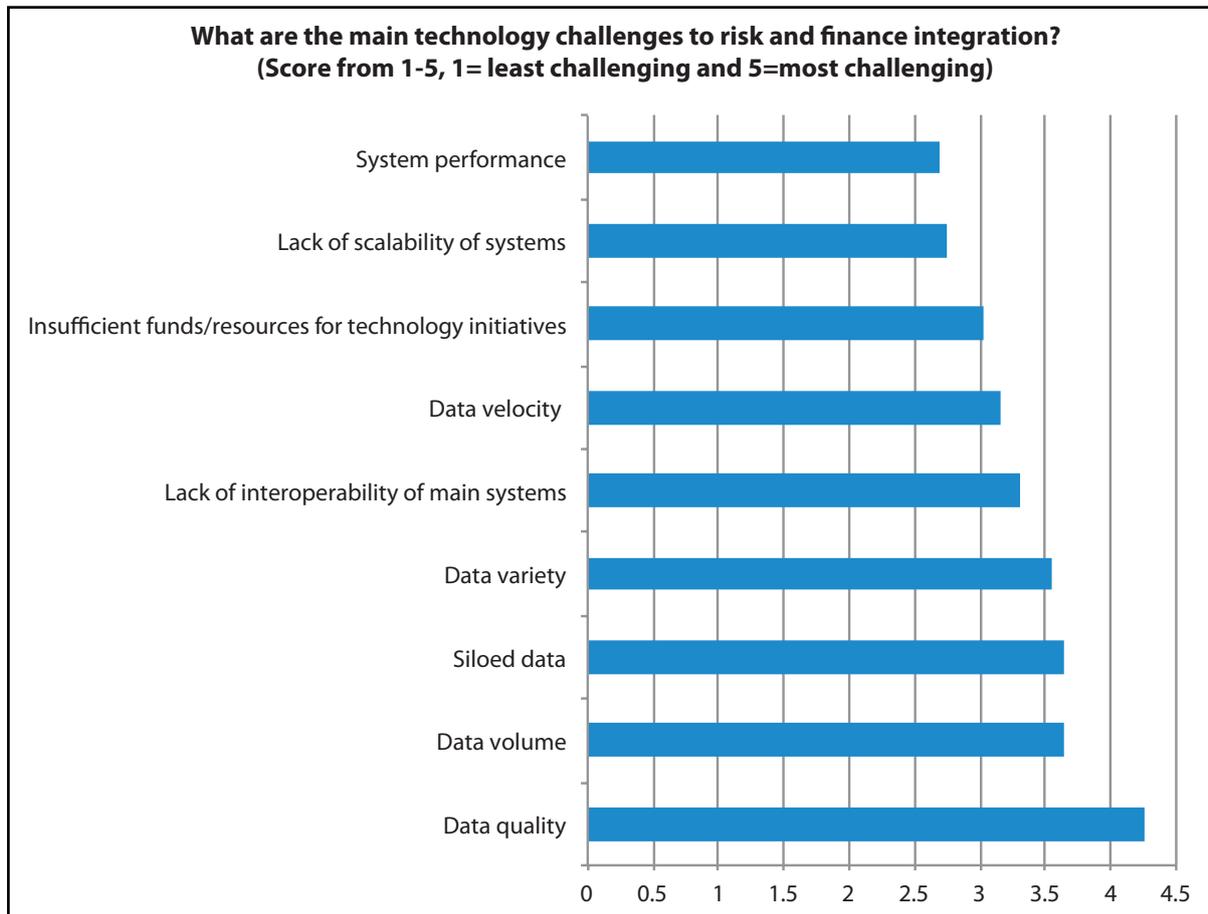
**Figure 5: Obstructions to aligning risk and finance**



## 2.2 Technology Goals and Challenges

The survey also asked respondents what technological solutions or issues might be needed for or result from financial and risk integration. The primary focus from the respondents was on data management and the need for high quality data solutions, with problems including a lack of knowledge of the current market solutions, and the replacement of legacy systems.

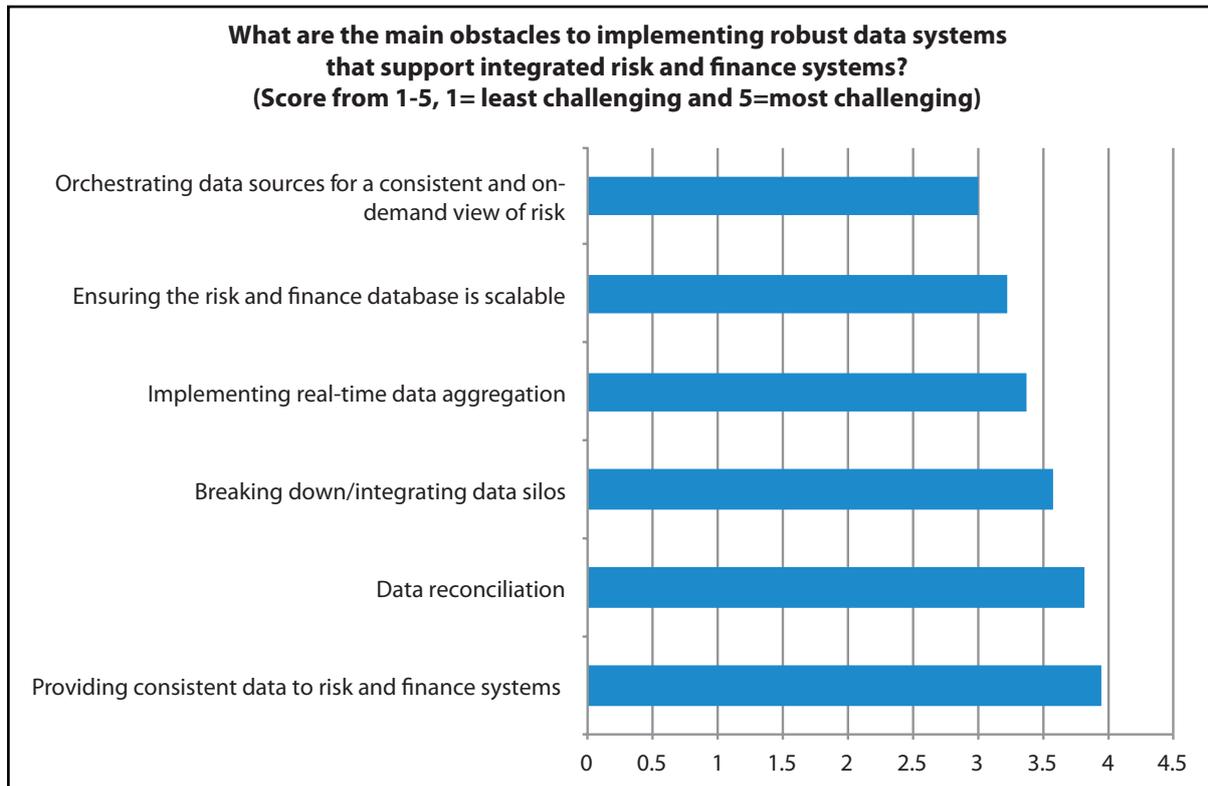
Figure 6: Technology challenges to risk and finance integration



As Figure 6 shows, in contrast to many of the other questions throughout the survey, there was a notable front runner in technology challenges to risk integration – quality of data. This was accompanied by the traditional Big Data issues of variety and volume, as well as siloed data. These issues are all part of the same problem of gaining useful insight from large quantities of data, often from different and potentially isolated sources. System performance and scalability, by comparison, were considered to be relatively unimportant challenges. Respondents in follow-up interviews confirmed that data is their main challenge and number one priority when launching integration projects. Interviewees said that the timelines of their overall projects would depend on the success (or not) of the data integration aspects of the project.

The most challenging data issues are, as Figure 7 shows, providing consistent data, and reconciliation of data, followed by integration of data silos. Once more the concerns specify data quality and communication and interaction between different data sets. The least challenging issue was considered to be orchestrating data sources for a consistent and on-demand view of risk, implying that organisations are able to implement interim capabilities such as aggregating risk on-demand relatively quickly to provide benefit to the business whilst the bigger challenges of data consistency, reconciliation and integration are resolved for the broader integrated risk and finance requirement.

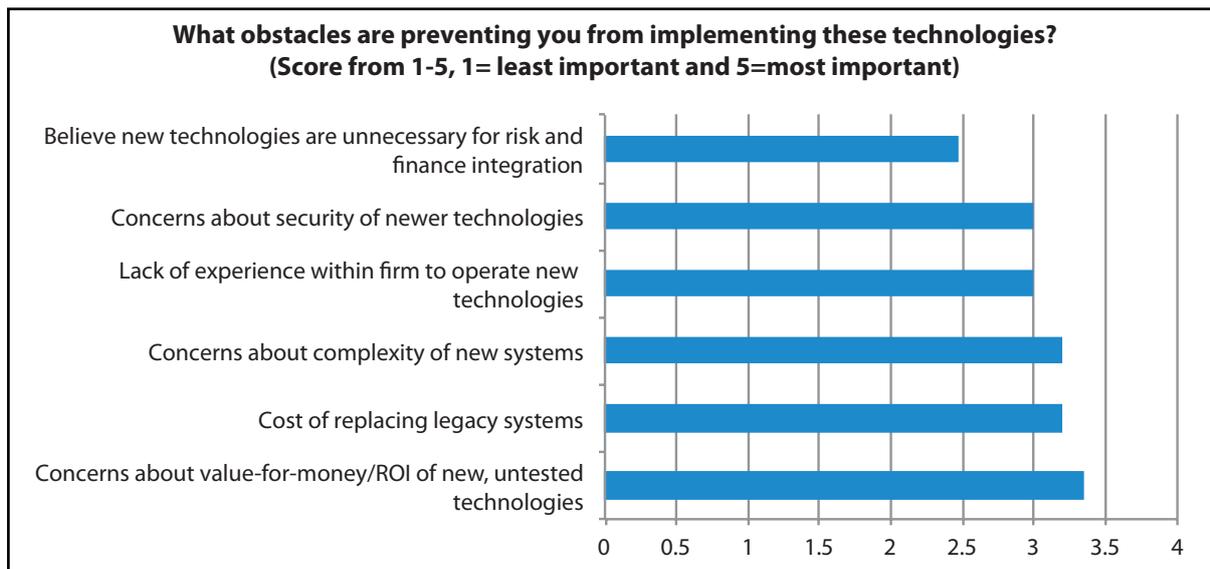
**Figure 7: Obstacles to implementing robust data systems**



The greatest barrier to implementing new technologies is currently uncertainty about the costs and abilities of new technologies. As Figure 8 shows, the most common barrier to implementation is concern for the efficacy of new technologies, in addition to concerns about their complexity and the cost of replacing legacy systems. Respondents in follow-up interviews said that, as legacy systems were proving an issue now, they were worried about the flexibility and future costs of new systems. Interviewees argued that new systems might only be cutting edge briefly and would then need to be replaced again, especially if regulatory requirements changed. Respondents therefore want solutions that could enable an infrastructure that, if possible, provide them with more flexibility, rather than new legacy systems.

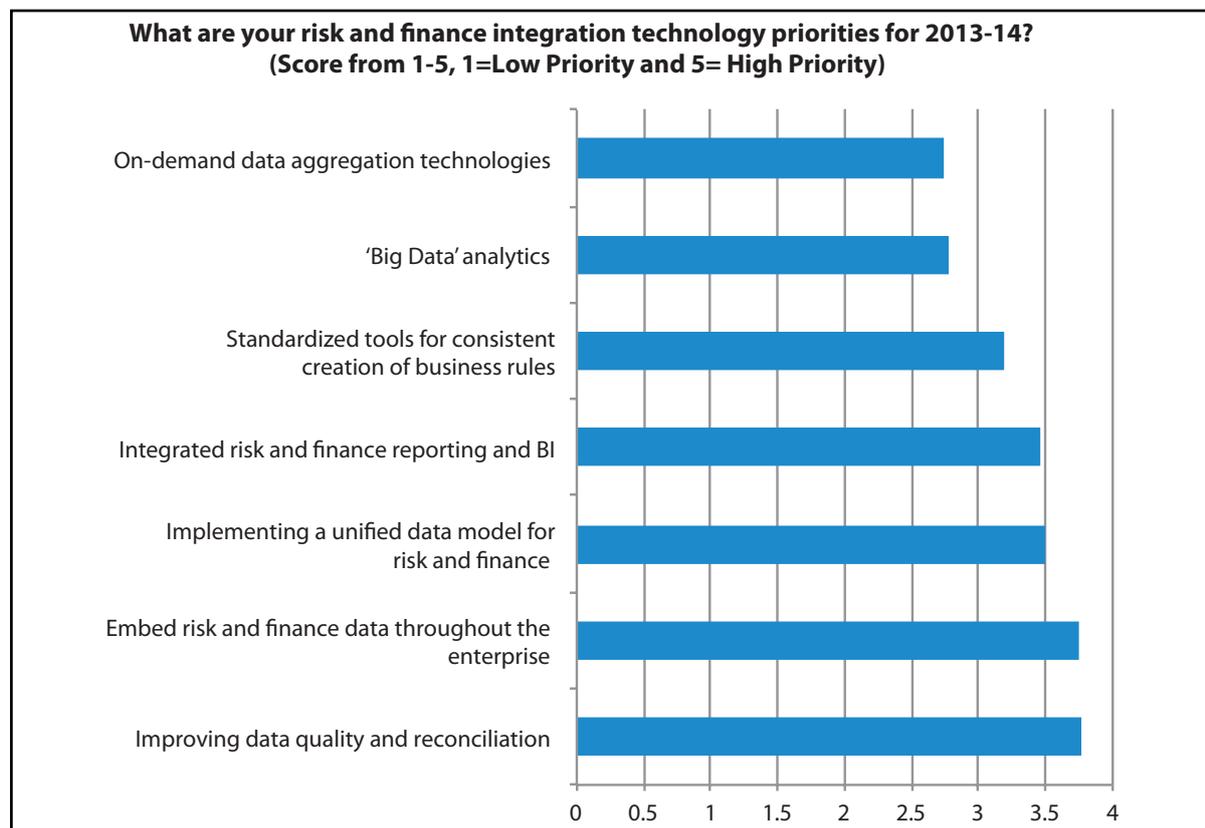
The least common response was that new technologies are unnecessary for integration. This indicates that most companies believe that technological solutions are a necessity, and it is purchasing and implementation costs that are the obstacles.

**Figure 8: Obstacles to implementation**



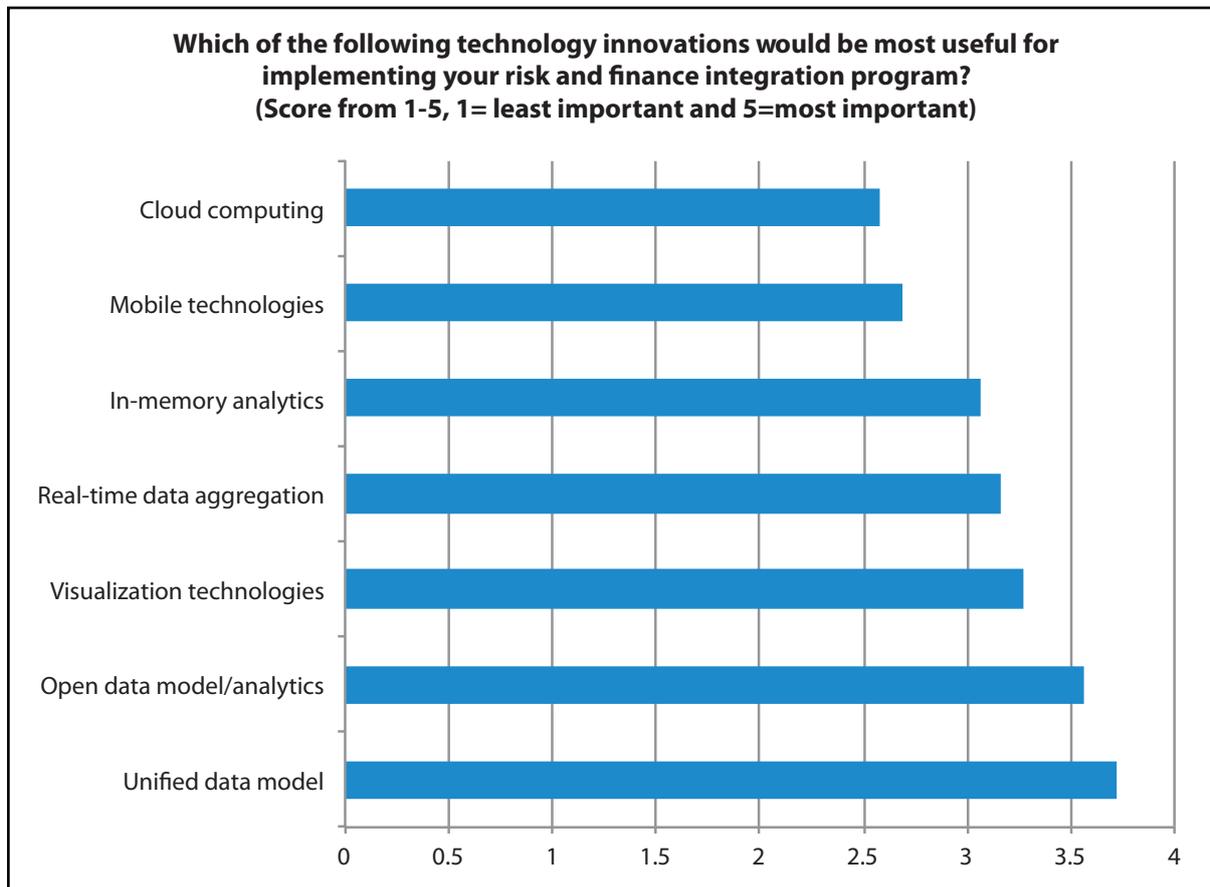
As Figure 9 illustrates, data quality appears once more, as respondents' chief technology priority for 2013-14, joint with embedding risk and financial data throughout the enterprise. This demonstrates the growing tendency to analyze risk across the entire firm rather than in isolated silos. The focus on and need for improved data quality means that banks are not able to look into future capabilities such as Big Data analytics and on-demand aggregation, which are consequently considered to be lower priorities. Conversations with interviewees suggested that firms are more interested in getting the foundations of data management right, to ensure data quality and consistency, rather than implementing Big Data capabilities.

**Figure 9: Risk and finance technology integration priorities**



Of the technology innovations available for risk and finance integration, a unified data model is considered to be the most useful, followed by open data models/analytics, as Figure 10 demonstrates. This reinforces the need for compatible data sets that allow for quick communication and transfer. Cloud computing and mobile technologies are considered to be the least useful. This may be due to the lack of knowledge and concern regarding these innovative technologies among respondents.

**Figure 10: Technology innovations**

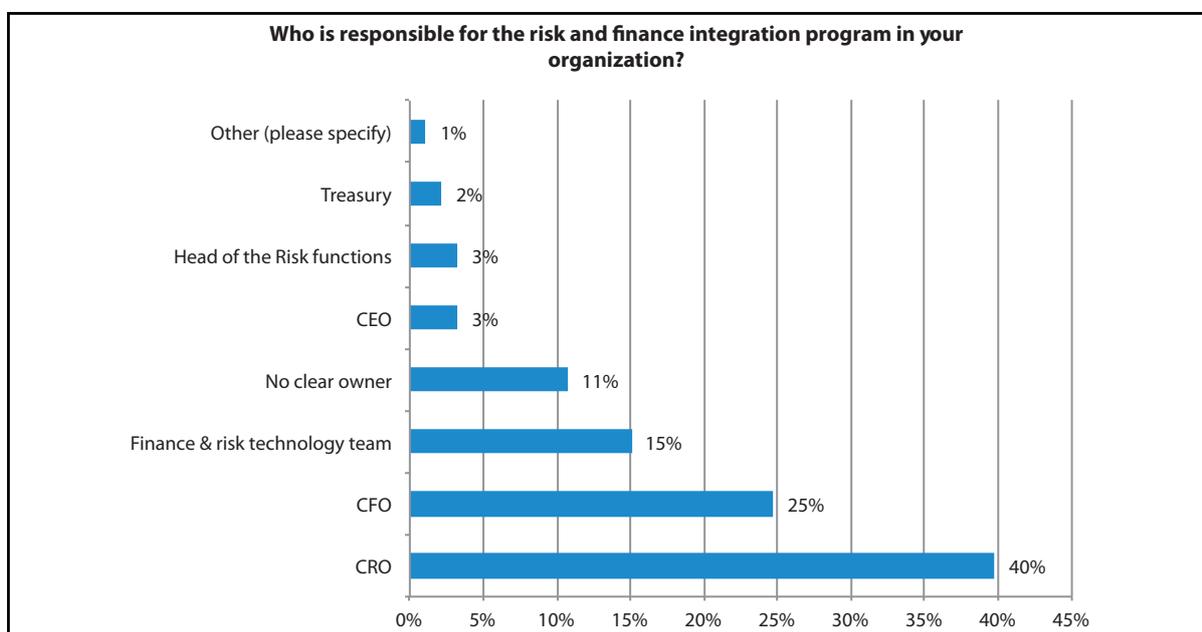


## 2.3 Budgets and responsibilities

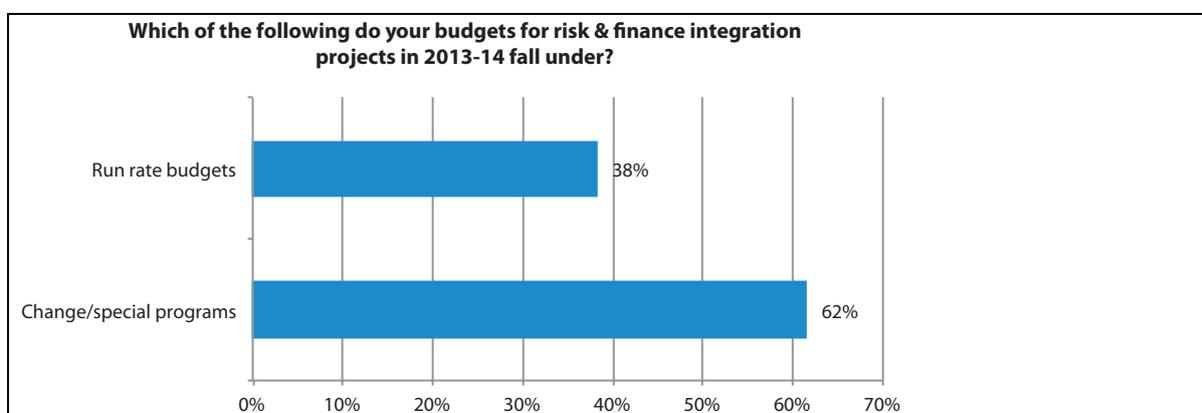
As Figure 11 demonstrates, the most common person responsible for finance and risk integration at the surveyed firms was the Chief Risk Officer. However, there were also a number of firms which used Chief Financial Officers or CEOs to perform risk and finance integration, partly because Sarbanes-Oxley and Basel have been seen as finance events in some US banks, and in some cases risk and financial integration programs had no clear owner at all. For the surveyed respondents, funding for risk and finance integration came from two sources: rate budgets and change/special programs, as Figure 12 shows. The use of change and special budgets by 60% of respondents shows that banks are setting money aside specifically for risk and finance integration and recognize the need for transformation projects.

Follow-up interviews showed that a number of banks are doing more to set up joint teams to lead these programs, as the overall aim is to develop a closer working relationship between risk and finance and to enable cross-fertilization of ideas between the two functions. Respondents also said that they thought a close working relationship between the CFO and CRO would help to set the right tone throughout the organization.

**Figure 11: Responsibility for risk and financial integration within firms**



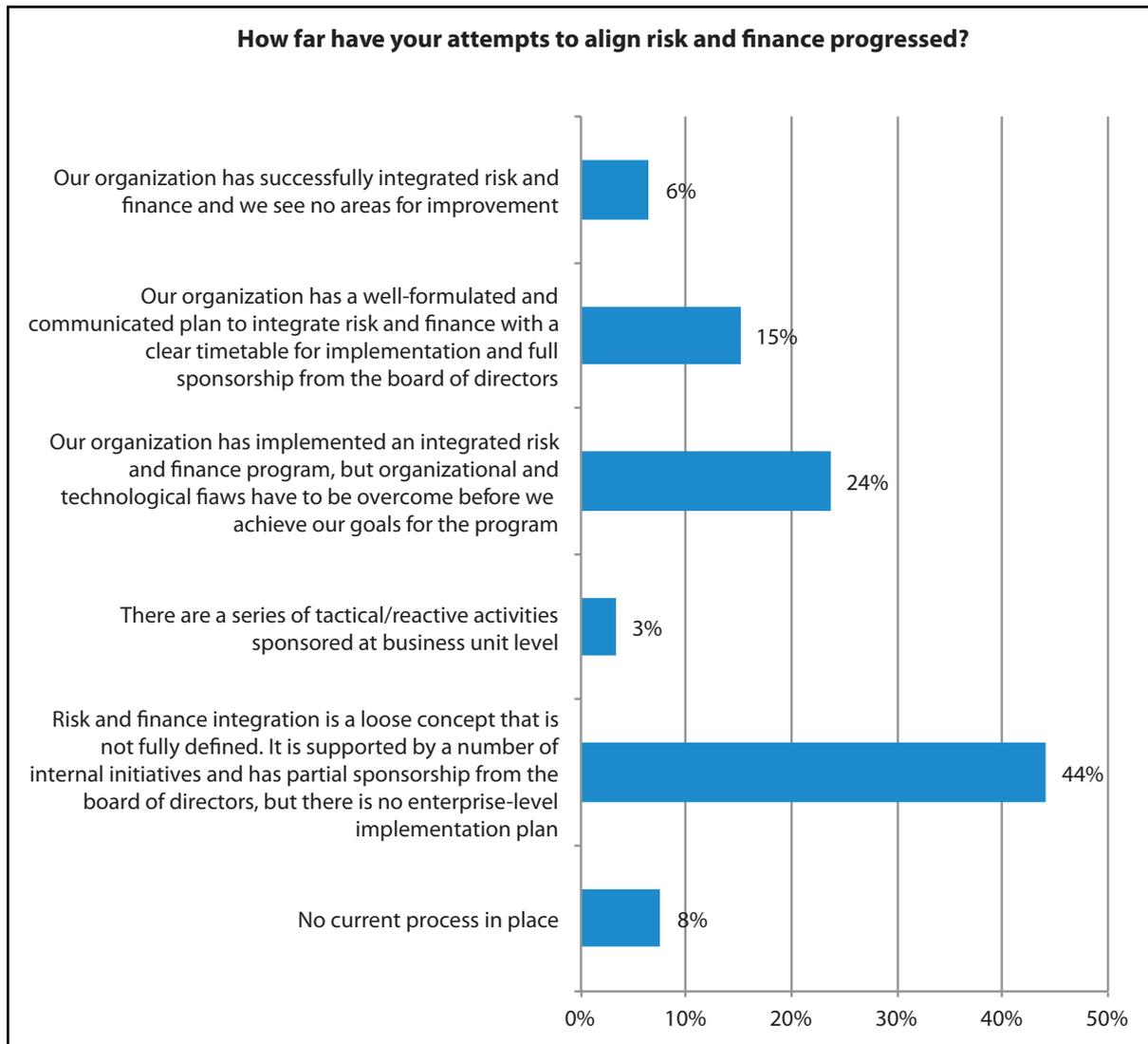
**Figure 12: Budget sources**



## 2.4 Current and Future Progress

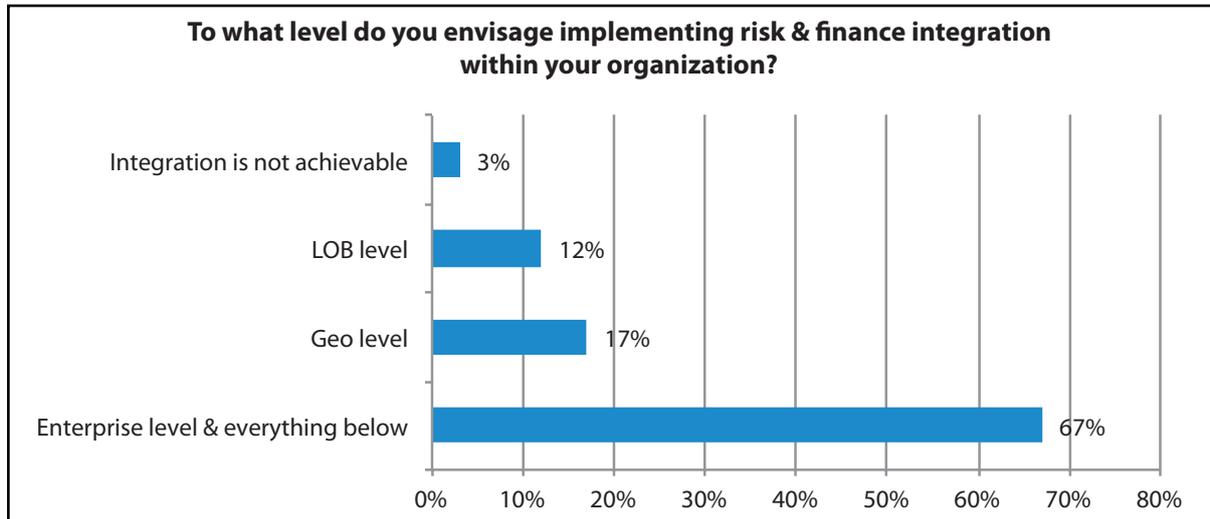
The responses to the survey show that while most financial institutions want enterprise-level integration, few consider themselves to be well-integrated, or have concrete plans to achieve integration. As Figure 13 shows, few firms have no current process in place, and similarly few have no areas for improvement. The vast majority fall in the middle ground, where integration is supported but is not near completion. The most common stage of integration is that it is a loose concept with no enterprise-level implementation plan.

**Figure 13: Level of progression**



As Figure 14 shows, the majority of companies want to implement risk and finance at the enterprise level. Respondents in follow-up interviews noted that regulatory requirements were making an enterprise-wide approach necessary. While a few companies indicated that they would be implementing at a geographical, or level-of-business, almost none of the surveyed respondents thought that integration was not achievable. The responses to the two questions illustrate that while most companies want to implement enterprise-wide risk and finance integration, a large proportion of respondents (54%) do not yet have a enterprise level plan.

**Figure 14: Level of implementation**



## 3- Chartis Viewpoint

### 3.1 Drivers for risk and finance alignment

While the integration of risk and finance functions has long been a goal for banks, the financial crisis has acted as a spur for firms to realize their plans and accelerate their implementation timetables. The financial crisis was a factor pushing for integration, as the inadequacies of systems and performance measurements led to errors that made it difficult for banks to understand their true position, how to respond to the crisis, and increased the impact of the crisis on banks.

Moreover, the financial crisis has led to range of other factors driving alignment. In a harsher financial climate, senior management is demanding better information on their financial position and risk profile. The front-office also wants information in real time. Shareholders are demanding improved performance management measurements to ensure unnecessary levels of risk are not taken. Finally, new regulations are creating an increased need for integration.

#### 3.1.1 Regulation

Banks need to deal with a new raft of regulation headed their way. Of primary concern for many banks will be Basel 3, but IFRS is also a key driver, particularly for European banks. The increased complexity of the regulations now requires integration of the two functions to improve efficiency and the calculations and reporting requirements need to be supported by integrated risk and finance technology. This view was supported by respondents in in-depth interviews, who noted that regulation made an enterprise-wide approach to risk and finance alignment necessary.

Basel 3 (as well as Basel 2) will require integration to support calculations for a number of metrics, including RWA capital ratios and the liquidity ratio. Integration will support these calculations directly, as banks will need both risk and finance data to get accurate numbers and reflect both risk calculations and their financial position. Relying on one set of numbers or attempting to match data from disparate sources will lead to inaccuracies and reconciliation issues.

Risk and finance integration can also support a more efficient allocation of resources. Increased pressure on assets means firms need to improve capital management. Interviewees said risk and finance integration would help to improve return on capital measurements and optimize returns. Some suggested they are developing an integrated capital planning team from risk and finance to support these goals.

IFRS will also require greater integration of risk and finance because the standards are more forward-looking than previous incarnations. Greater use of future cash flows in the new standards uses risk measurements and new disclosure requirements, notably for hedge accounting, require disclosure of the firm's risk management strategy, and data and calculations used. The need for buy-side institutions to submit risk exposure figures under the US's Form PF will also create industry-wide reconciliation effects. Sell-side and supporting infrastructure firms will be involved in data transfer and reconciliation processes.

Integration will be especially valuable in two key areas: reporting and stress testing. Banks must submit numerous reports for areas – capital, liquidity, and IFRS – that have significant overlap, but must be formatted differently. A single reference point to support integrated reporting would promote efficiency, data quality, and streamlined regulatory reporting. Interviewees said a common data source for controls and reporting was a crucial goal for their integration projects.

Interview and survey respondents also emphasized the importance of making stress testing a joint risk and finance responsibility and process. Senior management is now expected to understand and be more involved in the stress-testing process. Risk and finance need simulations and stress tests for the same events, so even if stress testing engines are not integrated, results should be compatible and based on common data.

Supervisors are also asking to see evidence of risk and finance collaboration in banks. Regulators see links between risk and finance measurements and want greater consistency. Although alignment is not a requirement, demonstrating cooperation between the functions will help banks to get into the good graces of supervisors.

### **3.1.2 Risk-based performance measurement**

After the financial crisis, firms recognize they need to take a more proactive approach to balancing performance with risk. During the crisis, it became clear that risk and performance measurements were disconnected. The front office was operating with little knowledge of the risks it was taking and banks did not have an accurate enterprise view of the risks they were taking.

Banks want a more complete view of business decisions, operations, and expected vs. actual performance. These require greater information alignment between risk and finance, and could substantially improve decision-making. The use of risk-adjusted financial data for front-office decisions, and the use of back-office operational data to support risk-based price verification are two examples of how risk data could be embedded in areas normally reserved for finance.

Banks, under pressure from legislators and regulators, are also reviewing incentive and compensation structures to promote risk-appropriate behavior throughout the organization. Risk-based performance measurement, incorporating top-line performance and risk exposure, can improve decision-making, analysis, and forecasting of strategies and investments.

To measure risk-based performance, banks need indicators such as RAROC, RORAC, and return on value at risk (RoVaR) to take into account both historical (“lagging”) factors and forward-looking (“leading”) factors. Banks also want to use integrated risk and finance data to give more weight to stress tests results and the potential impact of fat-tailed distributions.

### **3.1.3 Improved communication**

The financial crisis was a crisis of communication. Banks were unable to understand the information in high volumes of data, partially because they could not reconcile data effectively and compare data from different functions. Firms were therefore unable to get a clear picture of where they stood. Interviewees said establishing a common language between risk and finance functions would be crucial for an effective working relationship and effective communication would be important for achieving alignment.

Firms will be able to use the same data for different functions and analytics, produce different information, and ensure consistency. Data can be used for risk and finance measurements, and business intelligence purposes. This will facilitate greater communication, collaboration, and efficiency. It will embed information across the enterprise, ensuring all functions can be informed of risk and finance concerns. This will provide better information for decisions to be made upon.

## 3.2 Barriers to implementation

As the responses to the survey show, despite the willingness of banks to implement risk and finance integration projects, there are a number of obstacles. These obstacles threaten to either make integration projects a practical impossibility or to make the cost of implementation too high. The barriers can be split into two categories, technology and organizational ones.

### 3.2.1 Technology barriers

One of the leading problems is the existence of legacy systems. Integrating risk and finance systems will require standardizing information systems, including data definitions, information reporting, technology systems, and analytical tools and systems. However, many firms still have fragmented and silo-based data systems and firmly separated risk and finance systems. This creates a number of problems for banks implementing integrated systems:

- Existing systems were expensive to build and would be expensive to dismantle. There is also no clear replacement model, especially if firms span multiple locations with separate business and regulatory environments, making implementation unattractive.
- Though risk and finance often use similar sets of data (although from different sources and at different levels of granularity), they were treated as different because of their differing perspectives (risk looks forwards, finance backwards) and calculation methods. Interviewees said that getting rid of the walls across firms was a difficult, but necessary challenge.
- Separate data systems create inconsistencies and duplication, making communication between the two functions difficult. Both ultimately report to the C-suite, but misalignment of data makes it hard to reconcile information presented to senior management.

A major cause of this fragmentary and silo-based approach is that vendors offering point solutions have historically dominated these technology markets. They developed solutions in response to specific market or regulatory requirements, leading to solutions with only those functions. Finance systems have been difficult to change, as they have a far-reaching extent within the bank and new systems generally provide low ROI. Banks have also not had overall risk and finance technology budgets, and vendors sold to specific areas of the bank.

The discrete nature of the market allowed vendors to become specialists, making it sensible for banks to purchase best-of-breed systems. As a result, many banks have built their risk and data technology architecture in a piecemeal fashion, collecting modules when they became necessary, creating a disjointed system and data silos. The silo-based system was static and more practical for the backward-looking finance function than the forward-looking risk function. Risk requires a more dynamic data system to succeed, as it needs to produce end-of-day numbers against finance's end-of-month processing.

To deal with separate systems, banks often used expensive and error-prone manual reconciliation. This has been an inefficient stop-gap measure that took valuable and scarce resources away from risk and finance functions. The high volumes of data entering banks now make it an unfeasible and ineffective solution. Firms need enterprise-wide data standards and data processing models. This is a difficult task with numerous data management challenges, principally the difficulty of processing high volumes of data in a range of formats, with a range of unstructured products and data. Doing this, while ensuring data quality, is a challenge that, as the results of our survey show, has made integration projects difficult to complete. Data integration requires robust data management to consolidate data with consistency and quality.

Interviewees said that fixing the data management problem was a key challenge and the most important part of their projects. However, they had concerns about integrating risk and finance technology systems fully. They felt this could leave them with inflexible systems that would have to be ripped out when regulatory or market requirements changed.

Some respondents therefore said they wanted only to implement an underlying data platform that could send data to different places for data mining and analytics. They said this would allow them to maintain different analytics for different systems and remove analytics if they became out-of-date, while leaving the data platform to enable aligned risk and finance in place.

### **3.2.2 Organizational barriers**

Organizational barriers within banks are also significant. The divisions between risk and finance functions and the front and back office are significant and require a culture change to overcome. As the results of our survey show, the diverging priorities of risk and finance and the unwillingness of functions to cede autonomy is a major barrier to integration projects. The cost of investment in an era of shrinking margins and increased regulation is also an issue.

Risk and finance have historically been independent functions with their own perspectives and responsibilities. Both functions can be reluctant to integrate because they fear they will lose control of their budgets and will be forced to relinquish their perspective. Interviewees worried that full-scale integration would lead to one function taking charge and intellectually dominating the other, depriving the bank of separate viewpoints.

Different areas of the bank need to communicate with one another in a mutually comprehensible way and their divergent (but not incompatible) aims should be balanced and aligned. In practice, this means that while technology systems may need to be integrated, banks should align risk and finance to overcome organizational resistance. Technology should be used as an enabler for risk and finance functions to work from the same data and produce reconcilable and consistent results, while preserving their independence.

## **3.3 Towards an ideal architecture**

Risk and finance integration requires a robust technology system to support it, and, as the results of our survey show, the most crucial element of this technology system must be a data management platform that can effectively support risk and finance integration. Financial and risk analysis is only as good as the underlying data that it uses for its calculations. Inaccurate or incomplete data can distort or hide the risks that are faced, and can create a lack of understanding within the enterprise that renders integration fundamentally flawed.

Chartis has identified the following technologies as crucial for integrating risk and finance:

- Development of group-wide common application architecture for finance and risk, using common data processing and check-in/check-out points;
- Development of common data models with standard tools;
- Central program steering with local execution;
- Reduction of the number of source applications;
- Introduction of source-based unified services layers reducing the complexity of interfaces; and
- Consolidation and standardization of IT storage infrastructure.

The key attributes of a risk and finance architecture include:

- Rules-based creation of standardized finance and risk data instead of multiple delivery systems creating the data;
- Standardized data delivery by product from source systems;
- Standardized rules by product used to generate G/L and warehouse data;
- Risk and finance data warehouse based on a standardized data model that serves needs of finance (management accounting and financial accounting) and needs of risk (market risk, credit risk, operational risk and compliance);
- Risk and finance data warehouse is automatically reconciled with G/L; and
- Data marts serve one or more business needs.

The key feature of all of these systems is robust data management systems. Risk and finance integration relies on maintaining a reliable, consistent source of data that supply both risk and finance applications. If the data management system is robust enough, it will allow firms to be flexible in how they construct the rest of their risk and finance architecture.

If a single point of truth can be created and users can drill back down to this level, then the data can be distributed to individual applications to be put into analytics and valuation engines. However, banks and vendors are no longer wedded to the single-point-of-truth viewpoint, aware that it has sometimes led to inflexible systems. Openness and efficiency are now watchwords in the industry and banks are less keen on the idea of a static, heavily structured data model. Instead, multiple, but consistent points of truth within an overall data management structure are seen as more useful. If this data management system is robust enough, it will enable risk and finance applications to produce consistent results without needing to be fully integrated.

However, approaches to risk and finance integration have also been altered by the financial crisis and the increases in data volume and complexity. Some banks are questioning whether the rules-based creation of standardized data is too difficult and complex to be achieved, especially when many firms have presences in multiple locations and have diverse trading operations. This can create significant problems around data volume and variety. As a result, some firms are instead attempting to use external services or cloud-based processes to process data.

In part, this is because of cost considerations in many banks around technology systems. Although cost was not considered a major obstacle by respondents to our quantitative survey, a number of respondents in interviews did say that they were under pressure to find cheaper, simpler solutions that would provide good ROI. This pressure resulted from the wider pressure banks have been feeling to improve returns in a difficult market.

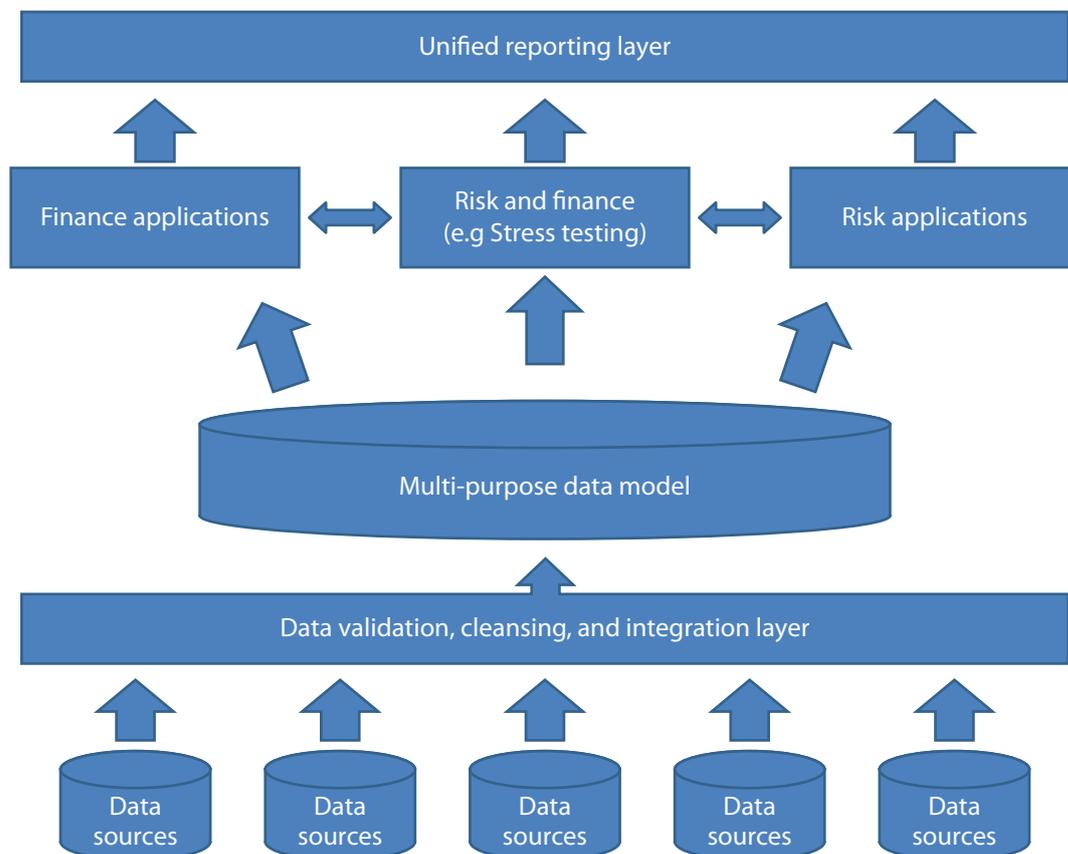
As a result, some firms have focused on keeping systems as open and efficient as possible. This has meant ensuring data consistency and dismantling silos to create an open data model. Some interviewees have suggested that are using systems such as Hadoop as a data layer and then extract data needed for calculations to cloud-based calculation services.

However, while this method can avoid infrastructure changes and the associated costs, it creates a number of other issues. Principally, it is harder to ensure data consistency and reconciliation under this system. Moreover, respondents to the survey and interviewees voiced their concerns about cloud services, particularly around security and privacy. The data governance issues and the complexity of regulations surrounding data usage mean that for some firms using the cloud is not an optimal solution to risk and finance integration.

To ensure a consistent source of data, banks need a unified data management platform that can draw data from across the enterprise, including transaction data, general ledger data, reference data, market data, metadata, etc. This platform needs to be able to ensure data quality by validating, cleansing, and matching data. The data model should be multi-purpose to allow for multiple, consistent sources of the truth to provide different calculation engines with the data they need in the correct formats.

The platform should also be able to avoid duplication and store all data in a consistent manner to allow for auditability and drill-down to the most granular level, while enabling the data to be used for more than one purpose. To enable risk and finance integration, the data management platform should also be able to link to multiple systems, to allow different applications to use the data flexibly.

**Figure 15: Example of target architecture for risk and finance alignment**



It is important that firms do not think of this as only a technology project; they must also think of implementation in terms of change management. Moving from a divided and possibly fragmented technology system to a more integrated system will create considerable disruption in the short term. Firms need to have plans in place to prepare people for the changes and should make special attempts to get finance and risk staff on board and help them to understand how the systems they use will change.

More importantly, if viewing implementation from a change management perspective, firms should consider how they want to implement new systems. Firms can often be tempted to try ‘Big Bang’ implementations that completely re-model systems, despite the fact that such an implementation will be the most costly, disruptive, and likely to go wrong. Instead, banks should consider where finance and risk integration is most urgent.

This will vary from bank to bank, as our interviews bore out – retail banks may focus more on integrating credit risk management with finance, whereas large investment banks may be focusing on integrating capital management. Firms should do their best to identify the areas of value for technology investment and then prepare an evolutionary approach for implementation. This should allow firms to phase in new modules of a system to prevent disruption and make it easier for staff to adapt to the new system.

## 4- Leading practices from SAP

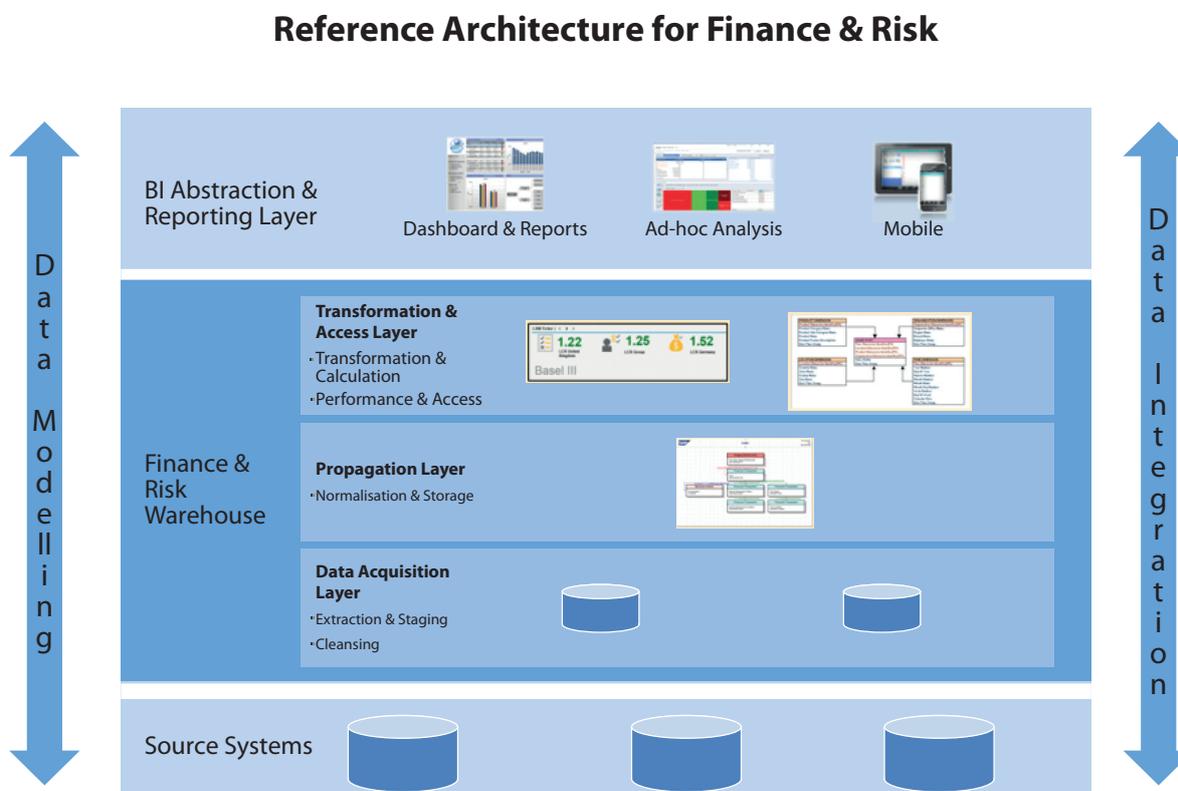
SAP is an enterprise application software vendor that helps companies of all sizes and industries to run better and enables customers to operate profitably, adapt continuously, and grow sustainably. SAP has invested in risk and finance integration solutions and its expertise in offering enterprise applications means that it is able to leverage technology innovations that complement risk and finance integration projects. SAP also incorporates leading industry practices to help to reduce costs for the maintenance of the finance and risk application landscape.

SAP's solutions are capable of helping banks to meet key technology requirements, particularly around data management. More importantly, however, SAP's technology solutions can help firms move beyond data quality and compliance issues to realize business benefits and ROI from risk and finance integration projects. Firms can use these systems to improve areas such as liquidity risk management and enterprise resource planning to improve efficiency and add value through the integration of risk and finance.

### 4.1 SAP Risk and Finance Solutions Overview

SAP has a number of solutions that provide relevant capabilities for a firm to carry out a risk and finance integration project. SAP's solutions reflect leading practices (sourced from Chartis's interviews) in a number of banks that are looking for technology systems that provide them with coherent and consistent data and shared reporting functionality. First and foremost, SAP offers a data management platform that enables firms to implement an enterprise data warehousing strategy that allows finance and risk to integrate with the data warehousing infrastructure. SAP's banking and data management solutions enable banks to install a data management platform and dismantle existing silos. In addition to data management, SAP also provides aligned calculation engines and information management systems for risk and finance.

Figure 16: SAP Risk and Finance Data Management



SAP's central technology solutions for risk and finance include:

- Finance and Risk Application Platform – It allows firms to create a single, semantically integrated data platform for all finance and risk scenarios related to financial products. The platform is flexible and can be used as a foundation for SAP- and non-SAP-based solutions.
- Enterprise Data Warehousing – SAP's solution can manage high volumes of customer, transaction, finance, and risk data in a multi-purpose enterprise data warehouse. More importantly, the enterprise data warehousing application can break down application silos and bring data together to allow end-users to utilize it effectively.
- Enterprise Information Management – SAP can integrate data from a variety of sources, in real time or periodically, and centralize data modeling and flow management. It can then present this data in a simple and consolidated format to end-users.
- “Big Data” – The SAP HANA platform, SAP's Big Data application, can be leveraged for a wide range of complementary solutions, such as the accounting for financials accelerator and the SAP Liquidity Risk Management application. The SAP Finance and Controlling Accelerator provides instant access to large volumes of data, allowing users to complete period-end reports quickly and effectively for financial accounting, controlling, material ledger, and production cost analysis. The Liquidity Risk Management application uses SAP HANA to analyze hundreds of millions of cash flows quickly. Using SAP's investment in Big Data can also reduce data redundancies and speed up the reporting processes.
- Advanced analytics – SAP finance and risk applications can leverage SAP's capabilities in the areas of data visualization and enterprise information management.

Collectively, these technology solutions, if implemented on an enterprise-wide basis, can allow banks to achieve a number of key business goals:

- Centralizing all financial product-related calculations and valuations on one central application platform to enable the data to be re-used as much as possible, while reducing the total cost of ownership.
- Creating an enterprise source of truth in a multi-purpose data model and integrating the data warehousing application with the finance and risk application platform.
- Using in-memory analytics to decrease processing time and to simplify the information management architecture, enabling real-time calculations and allowing firms to implement a cost-efficient architecture.

Additionally, while SAP does offer an enterprise solution for risk and finance integration, its systems do not have to be implemented that way. SAP is able to take a modular approach to reduce the operational risk surrounding the implementation of new systems. SAP provides a road-map for step-by-step implementation that allows firms to take a safer approach to what can be quite a difficult and disruptive process.

SAP's implementation process attempts to identify what the most important areas are for that particular bank, such as Basel 3, IFRS, or implementing risk-adjusted performance management. After implementing solutions for these areas, banks can then build on top of the existing SAP architecture. Alternatively, systems from other vendors can be linked to the SAP architecture. This allows SAP's clients greater flexibility and allows them to implement risk and finance integration to the level they want.

## 4.2 Data management capabilities

SAP has designed its data management solution for risk and finance to meet the following requirements:

- Meeting regulatory requirements for finance and risk;
- Reducing costs by consolidating the risk and finance architecture;
- Providing real-time insights into critical business processes;
- Achieving low implementation costs through use of industry best practices;
- Using the full-application stack to address end-to-end finance and risk processes.

The preconfigured finance and risk data model provided by SAP is based on leading industry practices to meet business process requirements and can be extended to address customer-specific requirements. The finance and risk data management platform runs SAP applications. The platform can also be integrated with third-party applications to source data from SAP and non-SAP systems. A number of related SAP systems include out-of-the box integration to the finance and risk data platform.

The layered scalable architecture is a reference architecture that provides the flexibility to adapt to changing business and regulatory requirements and provides quick turnaround times for new projects. SAP's IFRA solution includes a source data layer (SDL) and results data layer (RDL) to support integrated risk and finance.

The layered data management architecture provides a number of key benefits:

- Multi-purpose data model – The system uses a predefined data model for financial products, enabling it to support a wide range of finance and risk valuation processes.
- Auditability – The data management platform uses a specific versioning concept that means that all alterations made to the data can be traced.
- Presentation and manual manipulation of data – A specific interface supports the presentation and manipulation of complete business entities and related data.
- Reconciliation of semantically integrated applications – Semantically integrated business applications have common data structures in the SDL and RDL, which enables easier reconciliation of data and can reduce errors.

SAP also provides data management solutions to address integration requirements, including real-time replication and extract, transform, load-based integration processes. Leading practices require banks to be able to access homogenous and consistent data for their calculations, while maintaining flexibility. Data can be harmonized across SAP and non-SAP data sources. If data quality in source systems is not of sufficient data quality, the solution can cleanse, extend, and match data. Well-documented information management architectures, data models, and data flows enable banks to leverage their data, quickly address new business requirements, reduce maintenance costs, and simplify the translation of business requirements into IT requirements.

SAP's data management platform is supported by its enterprise data warehousing capabilities. Enterprise data warehousing enables firms to consolidate their information management systems and manage the data acquisition process for the risk and finance integration platform, as well as for other applications. The enterprise data warehousing uses the SAP HANA platform, which leverages Big Data technologies to improve performance, simplify administration, streamline the system landscape, and provide self-service access to information at a granular level.

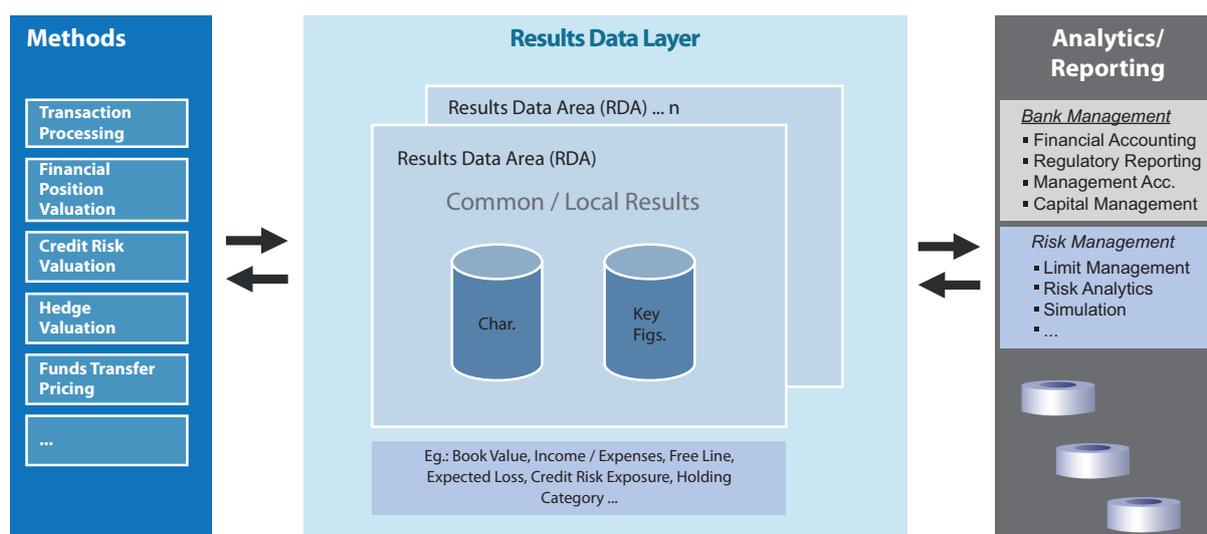
The data warehousing solutions also utilize SAP's in-memory technology innovations to enable real-time functionality and support faster decision-making. The warehousing solutions are the single point of truth for departmental and cross-company-based analytics down to the lowest level of granularity, enabling firms to implement standardized reporting processes and self-service analytics. SAP can provide out-of-the-box, end-to-end scenarios covering data sourcing, integration, harmonization, calculations, management of results, and reporting.

The SAP NetWeaver Business Warehouse component includes built-in functionality for security, load management, information lifecycle management, delta handling, and versioning. The value data warehousing solutions provide is enhanced by ability to integrate them with SAP's key analytical solutions for risk and finance: SAP BusinessObjects business intelligence (BI) solutions and the SAP Bank Analyzer set of applications.

### 4.3 SAP Risk and Finance application

SAP Bank Analyzer is SAP's risk and finance application that provides a single point of truth for risk and finance and is able to consolidate financial product-related data. The ability to create a single, auditable point of truth is a key requirement for implementing a risk and finance integration project, requiring the support of a robust data management system. The implementation of this type of system enables banks to reduce complexity and costs for the overall application landscape, improving efficiency, performance and communication between different functions. The simpler system allows firms to cut costs and do more with less.

Figure 17: SAP Bank Analyzer



SAP Bank Analyzer can help banks to eliminate application silos and consolidate the application landscape on one central data platform that manages data in an auditable quality. SAP's predefined data model reduces the implementation effort. The risk and finance applications are accompanied by a comprehensive set of applications, enabling a bank can get everything from one place. The applications are also open for third-party applications that can leverage the services of the software.

Regulatory and internal management requirements for risk and finance are based on financial products and related master and flow data. Data requirements for stress testing and scenario analysis also have a strong overlap with risk and finance requirements. Requirements such as risk-adjusted performance management need to use data from both of these functions in their calculations, making it essential to manage the results of these processes centrally. Using SAP's single-point-of-truth application can help to provide a more consistent viewpoint of risk and finance for banks to manage these requirements. While SAP's systems can provide data to stress testing engines, it does not provide specific functionality for integrated stress testing.

A key aspect of leading practices is the integration of risk and finance reporting to assist with regulatory requirements. Analytics solutions in SAP help firms to manage a range of risk and finance requirements, including reporting, planning, and predictive analytics. Analytics and valuation engines can be provided with consistent data to produce results for risk and finance, including for capital management, which Chartis's interviews have shown to be a key goal for banks' risk and finance integration projects.

In addition, role-specific interfaces address the needs of particular end-users, as well as senior management. This means that the required information can be supplied to staff at any level of the hierarchy, whether they are in the front or back office. SAP for Banking solutions can integrate with the risk and finance applications and come with prepackaged industry-specific analytical solutions.

Enterprise information management and reporting capabilities are also a key element of leading industry practices. The SAP BusinessObjects Business Intelligence suite enables organizations to gain valuable insights into the data. Preconfigured content can also be bundled with other analytics solutions from SAP, such as the SAP Enterprise Risk Reporting for Banking analytic application. This means that the risk and finance application can be used to provide data for risk reporting and for business intelligence, creating more integration and efficiency benefits. It means that consistent data can be used across a variety of functions and allows business intelligence and reporting functions to be linked more closely to risk and finance. It also means that communication will be easier between these functions, as they will be using the same data and results.

The risk and finance application platform is also integrated into the overall enterprise information management landscape. For some processes, periodic data loads are sufficient, but the risk and finance application also needs to be able to consolidate data from diverse source systems and provide to an infrastructure that supports real-time replications, while ensuring data quality.

In such heterogeneous system landscapes, modeling tools add value by helping to define and maintain the enterprise information architecture and enabling communication between business and IT. This is necessary to allow non-technologists to understand what data management systems are necessary to get the information required and for technologists to understand the needs of front-office staff. SAP solutions for enterprise information management provide the capabilities to load data in real time or periodically and can sustain a consistent architecture that provides data quality and clear information.

Real-time replication solutions from SAP make data available for analytics without any impact on the performance of source systems. Data integration solutions from SAP support extract, transform, load-based integration scenarios. To deal with data quality issues, SAP provides systems that can cleanse, match, and enhance data. Data modeling and metadata management tools help to establish governance processes and help to translate business requirements into IT requirements.

## 4.4 Big Data innovation and mobile capabilities

SAP is able to leverage its extensive investment in Big Data technologies. These technologies are highly effective for risk and finance integration, as they provide the ability to process high volumes of data in a variety of formats. This is essentially the data management challenge for risk and finance integration projects, which makes SAP's HANA database highly applicable to risk and finance integration.

SAP also provides mobile applications of its risk and finance applications to reflect the need for real-time responses and the increased use of mobile devices. SAP can provide intuitive role-based analytics and alerts on mobile devices, enabling banking teams to always have visibility on critical events and situations. Mobility solutions ensure users always have access to status reporting, ensuring quick responses and better decision making.

While respondents to the survey suggested that Big Data was not a key goal for the industry as a whole, Chartis's follow-up interviews suggested that the use of Big Data technologies, such as Hadoop, constituted a leading practice for a number of larger institutions. Big Data systems could provide banks with a competitive advantage, especially if they are dealing with particularly high volumes of data. While firms are right to want to get the basics of data quality right, they should also be aware of the opportunities to improve their return on investment by implementing more innovative technologies.

The HANA database can improve reporting performance by reducing load times. It can reduce administration costs, as it does not need to materialize as much data, and it can simplify the system landscape, as multiple applications can be run from one database instance and can share data without replication.

SAP HANA appliance software provides the required infrastructure to create non-materialized analytical views on the fly, based on operational data structures. The positive impact on data integration is that data does not have to be converted and aggregated anymore before it can be used in analytical processes. This is a crucial capability, as it allows for integrated risk and finance applications to perform real-time calculations. This means that risk and finance can be integrated without sacrificing speed or flexibility. SAP uses its Big Data capabilities for two specific capabilities around risk and finance integration: accelerated finance and accounting, and liquidity and liquidity risk management.

### 4.4.1 Finance and Controlling Accelerator

SAP Bank Analyzer can also be combined with the HANA database in a rapid-deployment solution for financial reporting. This solution provides real-time standard daily and ad hoc sub-ledger reports along with drill-down options inside the reports. Also, the combination of SAP HANA and SAP Enterprise Resource Planning (ERP) covers four key scenarios for core business processes and reporting: financial accounting, controlling, material ledger, and production cost analysis. Customers can employ the reporting tools of the SAP BusinessObjects™ portfolio to adapt and visualize the predefined, standardized sub-ledger reports.

The HANA system allows users to make better and faster decisions by enabling users to accelerate reporting, analyses, and period-end closing. Using the system can allow banks to identify opportunities to improve financial performance, improve financial decision-making, and get better insight into their finance position by making high-volume, ad hoc data queries.

The solution can be deployed rapidly and is also high performance. This allows it to tackle the crucial business challenges of data volume, the need for faster analysis and reporting, and the need for better process performance. Currently, management's lack of access to general ledger, material ledger, and other financial reports can result in poor cost control, and the timeliness of these reports is stymied by time-consuming and performance-intensive processes for reports.

SAP's solution accelerates period-end closing processes by analyzing millions of records instantly in dialog mode to provide new information on which to base decisions. The solution can provide faster access to existing general ledger account and balance sheet information, management reports, and can perform ad hoc queries and drill-downs into the data to improve information. Decision-making is also made easier by the provision of user-friendly, graphical self-service analytics. This makes it easier for users to access the data they need and to understand the information they get.

The real-time finance capabilities of this part of the SAP offering allow firms to get to the data more quickly and to make use of it more easily. This is the next step of risk and finance integration. Once banks have got the data right and have data of sufficiently high quality, it is important that they are able to use their data in an effective way, through Big Data, real-time capabilities.

#### **4.4.2 Liquidity and Liquidity Risk Management**

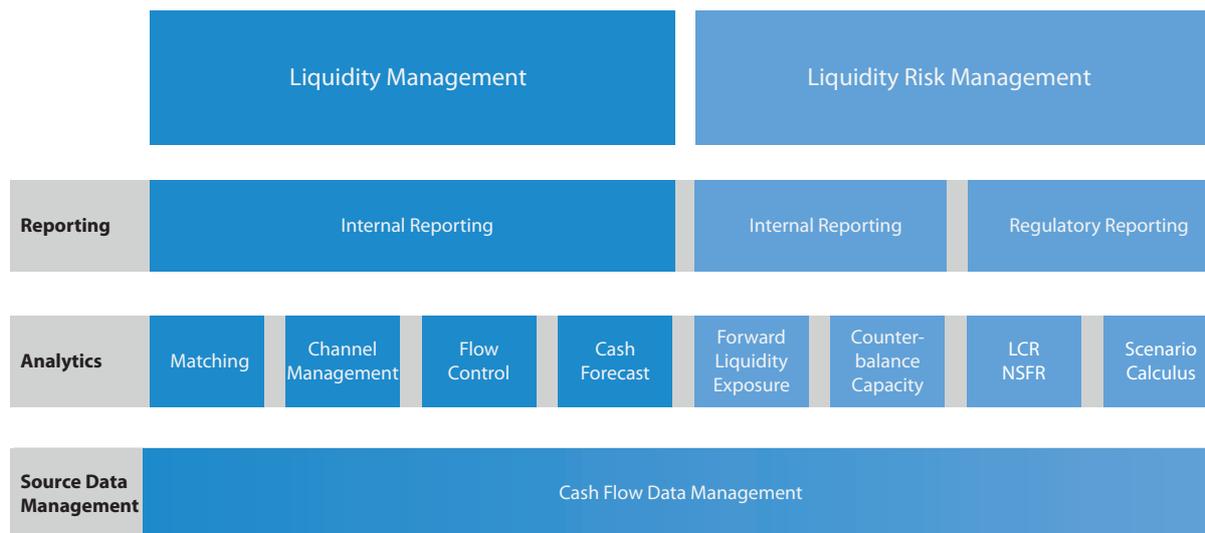
Liquidity management and liquidity risk management are an important area of overlap for risk and finance. Both rely on estimates of future cash flows and therefore require the use of both risk and finance data, as well as treasury data. It has recently become more important to make use of aligned risk and finance for liquidity, because of the new liquidity requirements introduced by Basel 3, such as the liquidity coverage ratio. The need for higher liquidity reserves means that payment cash flows and liquidity more widely needs to be managed more effectively.

The calculations need to be performed more quickly, so they can be incorporated into pre-deal checks. Banks need to forecast future developments to improve risk calculations and need to analyze instantaneously generated forward-liquidity exposures by various dimensions, run new ad hoc scenarios for direct results, and stress internal and external key figures in real time.

SAP's solutions enable banks to manage liquidity and liquidity risk across the whole organization in real time. The result is faster decision-making, pre-deal liquidity checks, proactive risk mitigation, and, ultimately, lower costs. SAP's advanced liquidity risk management capabilities enable banks to speed up decision-making processes and additional liquidity needs show up in the trading area to lower costs.

The software can perform internal and external, regulatory calculations in one environment. Liquidity coverage ratio calculations can be analyzed in detail, supported by drill-downs into the various cash flow attributes. The solution simulates regulatory indices over time to reduce contingency costs by limiting the liquidity cushion. The internal liquidity risk-relevant results can be stressed through ad hoc scenario calculations that already allow iterative scenario definition. Figure 18, below, illustrates SAP's integration of liquidity management and liquidity risk management.

**Figure 18: SAP Liquidity management and liquidity risk management platform**



Hundreds of millions of cash flows need to be analyzed for effective liquidity management, requiring quick analysis of terabytes of data. SAP uses its HANA platform and in-memory computing technology to support these requirements. It can calculate and simulate key figures through time, define stress scenarios, and visualize results. The solution consolidates bank and customer cash positions, payments, and liquidity information in real time, allowing users to monitor and control liquidity risk across time zones, currencies, accounts, and business entities on a shared platform.

High performance is a key goal for many banks and SAP aims to provide this through the use of the HANA platform. Hundreds of millions of cash flows can be scrutinized, and the solution will calculate and report requested results within seconds. Ad hoc simulation is supported in terms of instantaneous computation of newly defined scenarios (for example, for run-off rates or bond “haircuts”) with drill-down functionality. Calculated liquidity profiles like forward-liquidity exposure or counterbalancing capacity can be analyzed quickly, with further drill-down to the cash-flow attribute level if needed.

Users can drill down to the lowest cash flow attribute level and use predictive forecasting to enable improved decision-making that may provide a competitive advantage. Liquidity and liquidity risk resilience can be strengthened and funding costs can be optimized. The solution is also a global enterprise solution, allowing banks to consolidate customer cash positions, payments, and liquidity information automatically. Cash flow management is supported according to intraday real-time cash positions (current and projected for end of day) of central bank clearing, nostro, and customer accounts. Actual and expected cash flows can be matched in real time and the liquidity utilization can be monitored intraday.

This functionality enables better-informed currency decisions, additionally supported by identification of optimal liquidity strategies. Banks can view internal and external liquidity charges, based upon measured utilization and compliance with service-level agreements. This management information system improves insight into cash and liquidity operations. Payment and clearing is supported by end-to-end, real-time visibility of payments over their lifecycle.

## 5- Final Thoughts

The results of Chartis's survey confirm that a majority of banks see the benefits that are available from aligning risk and finance teams and that they have started projects to achieve these goals. However, the results of the survey also show what has been a repeated pattern when it comes to risk and finance integration projects. While firms often start off with good intentions, projects often fall by the wayside because of institutional and technological barriers.

The financial crisis and regulatory requirements have opened banks' eyes to the potential value of integrated reporting, risk-adjusted performance management, and improved decision-making that can be gleaned from risk and finance integration. However, while firms are now willing to spend on risk and finance integration, the problems of aligning different teams while retaining their distinct viewpoints and of integrating technology structures remain.

Firms should focus on the business benefits that can be gained from risk and finance integration projects. While they may currently need to focus on mastering the data challenge, they need to recognize that data is not information. Firms need to think of what they can do with the data once they have solved data quality issues.

Firms should look at market-leading technology innovations that will allow them to get real value from risk and finance integration projects. Risk and finance integration can cut compliance costs, but more importantly, can improve the management of key assets such as liquidity and capital and can improve the efficiency of bank operations.

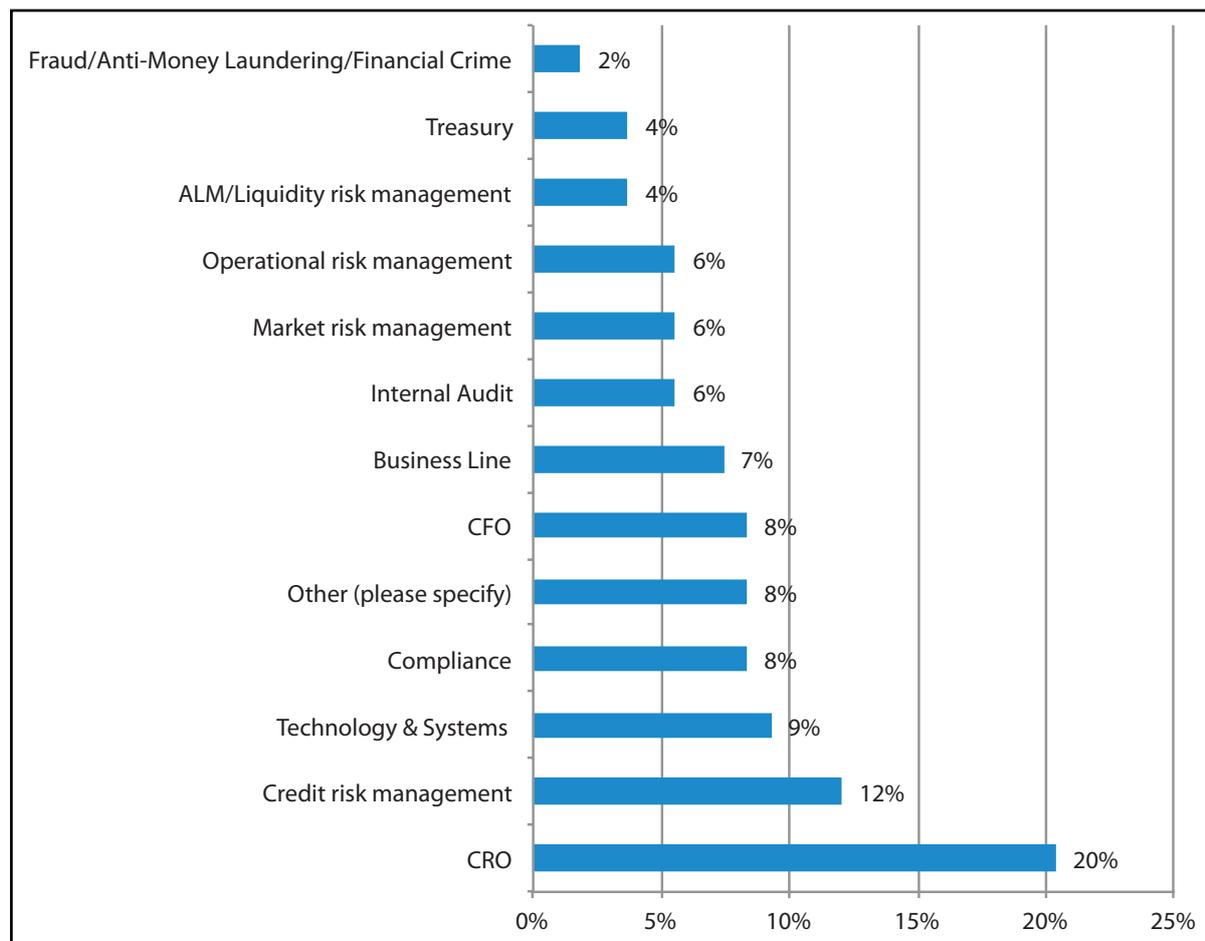
Chartis has argued for many years that risk and finance integration will offer competitive advantages to those banks that implement it and that technology vendors ought to invest in systems that would support integration. The market for risk and finance integration is now growing and firms like SAP that have invested in risk and finance solutions can now reap the benefits.

Chartis also believes that firms that invest in advanced technologies for risk and finance integration will gain competitive advantage. It is vendors that have invested in new and innovative technologies, such as SAP's HANA database, that can offer the most to buyers.

## 6- Appendix A: Survey demographics

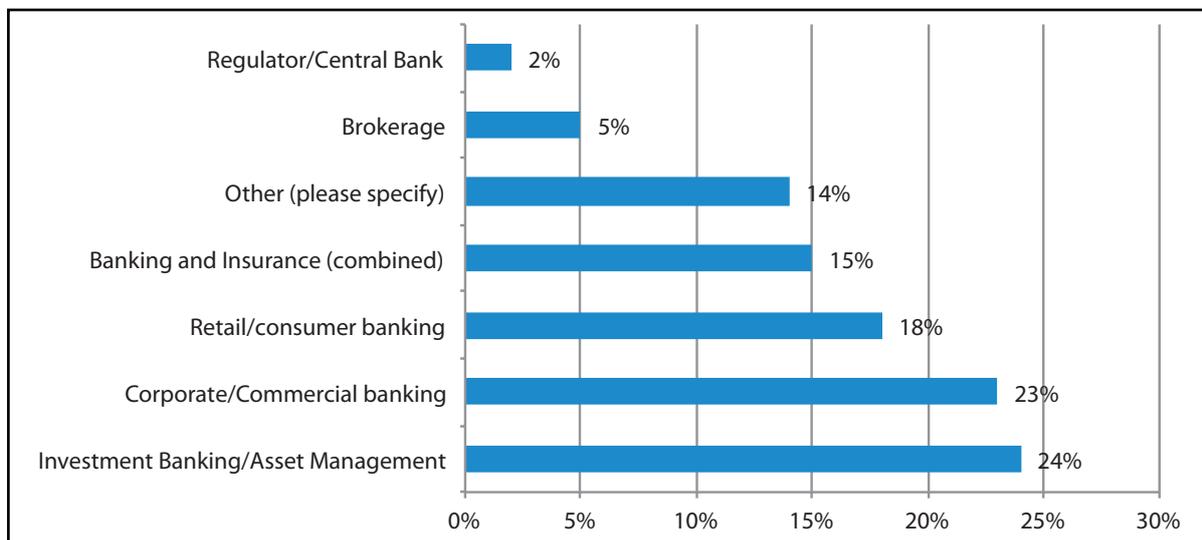
This section includes the demographic details of the respondents to Chartis's survey. The respondents included professionals from a range of practices and functions within the banks, at a range of hierarchies. Practitioners from risk management disciplines made up the largest proportion of respondents – 23% of the surveyed respondents were CROs or equivalents, and specialists in operational, market, and enterprise risk were also surveyed. Respondents from the business line formed the next biggest proportion, with other respondents including compliance officers, auditors, and technologists, as Figure 19, below, shows.

**Figure 19: Job function of survey respondents**



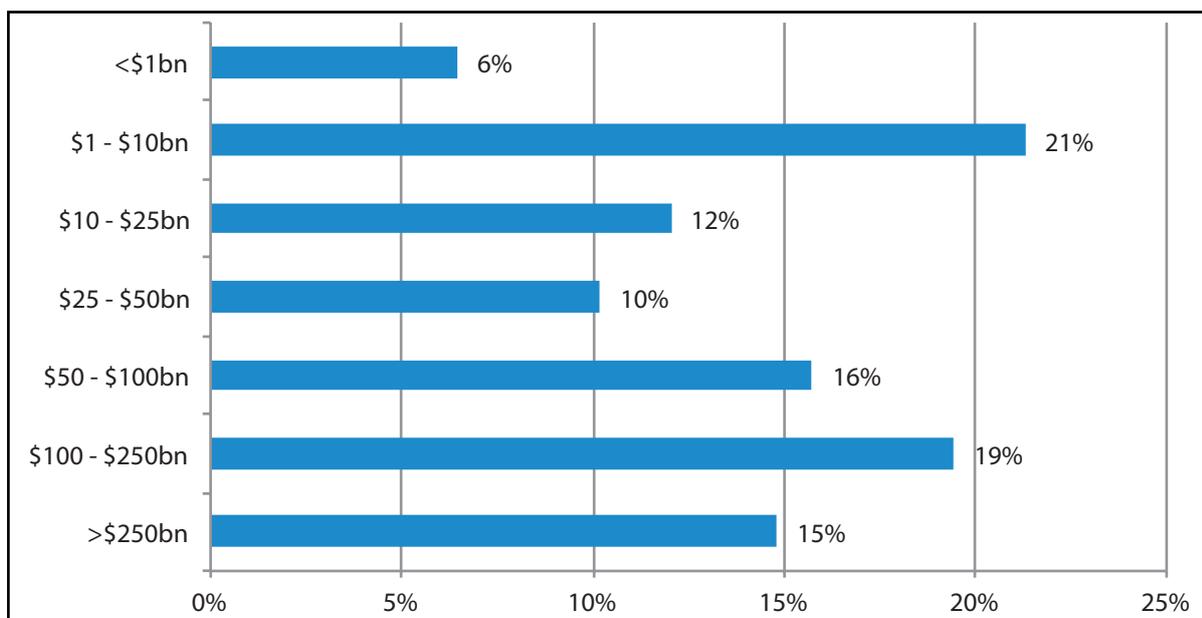
The most common business activities, as detailed in Figure 20, were corporate/commercial banking at 23%, and investment banking and asset management at 24%, but no vertical dominated the survey. Although the focus of the survey was on banking, responses were also obtained from insurance companies, central banks and regulators and technology vendors.

**Figure 20: Primary business activities**



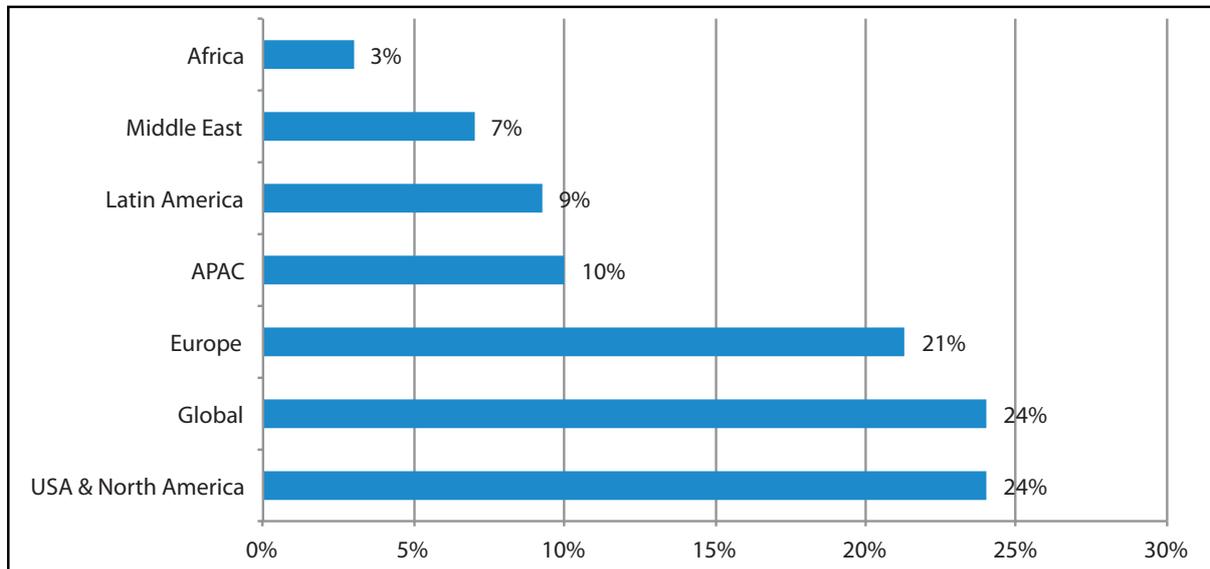
There was a wide breadth with respect to assets in the companies surveyed. Emphasis in the survey came towards the larger banks, as the vast majority of those surveyed had assets in excess of \$1 billion (94%), and 15% of companies were in the highest bracket, with over \$250 billion in assets, though there was a significant proportion of responses from banks with \$1bn-10bn in assets.

**Figure 21: Size of respondents' organizations by asset size**



The geographical coverage of the surveyed countries was comprehensive, as Figure 22, below, shows. The most representation was from Europe and North America, although there was also strong coverage of Asia-Pacific and Latin America. Additionally, a significant proportion of banks had a global remit.

**Figure 22: Geographical remit of respondents**



## 7- Further Reading

- Basel 3 Technology Solutions 2012: Horses for Courses
- IFRS Technology Solutions for Financial Institutions 2012
- Risk and Finance Integration 2011
- Liquidity Risk Management Systems 2011
- Counterparty Credit Risk Management Systems 2011
- Global Risk IT Expenditure 2011
- RiskTech100® 2012

For all of these reports see: [www.chartis-research.com](http://www.chartis-research.com)

## 8- How to use research and services from Chartis Research

In addition to our flagship industry reports, Chartis also offers customized information and consulting services. Our in-depth knowledge of the risk technology market and best-practice allows us to provide high quality and cost-effective advice to our clients. If you found this report informative and useful, you may be interested in the following services from Chartis.

### For risk technology buyers

If you are purchasing risk management software, Chartis's vendor selection service is designed to help you find the most appropriate risk technology solution for your needs.

We monitor the market to identify the strengths and weaknesses of the different risk technology solutions, and track the post-sales performance of companies selling and implementing these systems. Our market intelligence includes key decision criteria such as TCO (total cost of ownership) comparisons and customer satisfaction ratings.

Our research and advisory services cover a range of risk and compliance management topics such as credit risk, market risk, operational risk, GRC, financial crime, liquidity risk, asset and liability management, collateral management, regulatory compliance, risk data aggregation, risk analytics and risk BI.

Our vendor selection services include:

- Buy vs. Build decision support
- Business and functional requirements gathering
- Identification of suitable risk and compliance implementation partners
- Review of vendor proposals
- Assessment of vendor presentations and demonstrations
- Definition and execution of Proof-of-Concept (PoC) projects
- Due diligence activities

### For risk technology vendors

#### **Strategy**

Chartis can provide specific strategy advice for risk technology vendors and innovators, with a special focus on growth strategy, product direction, go-to-market plans, and more. Some of our specific offerings include:

- Market analysis, including market segmentation, market demands, buyer needs, and competitive forces
- Strategy sessions focused on aligning product and company direction based upon analyst data, research, and market intelligence
- Advice on go-to-market positioning, messaging, and lead generation
- Advice on pricing strategy, alliance strategy, and licensing/pricing models

#### **Thought Leadership**

Risk technology vendors can also engage Chartis to provide thought leadership on industry trends in the form of in-person speeches and webinars, as well as custom research and thought-leadership reports. Target audiences and objectives range from internal teams to customer and user conferences. Some recent examples include:

- Participation on a "Panel of Experts" at global user conference for leading ERM (Enterprise Risk Management) software vendor.
- Custom research and thought-leadership paper on Basel 3 and implications for risk technology
- Webinar on Financial Crime Risk Management
- Internal education of sales team on key regulatory and business trends and engaging C-level decision makers

Visit [www.chartis-research.com](http://www.chartis-research.com) for more information.