ADB

Technical Assistance Consultant's Report

TA-6454 (REG): Supporting Regional Capacities for Financial Asset and Liability and Risk Management

Risk Management and Asset and Liability Management in Banks

Focus Paper

Asian Development Bank

CONTENTS

1 Introduction to the paper

1. The topics of risk management and asset and liability management (ALM) in banks are particularly broad and each could be the subject of a separate book. The reality, however, is that each subject is interrelated and there is a logic in looking at them together. Deregulation in financial markets over the past two decades, together with the ensuing growth in new product offerings to customers, has supported the evolution of both. While ALM consists of a specific set of core bank management activities, it is encompassed within the overall risk management processes of the bank.

2. This paper is in no way intended to comprehensively review either subject. Its intention is to 'focus' in on key areas that are fundamental to the establishment and development of the risk management function in banks and on select areas of the ALM process where failure to get these areas 'right' can have a cataclysmic impact on the organization.

3. The early parts of the paper look at some of the more recent events in the evolution in risk management and oversight, and then moves on to examine a simple process that an organization can follow to better understand the risks it is running. This can be used to set a framework which the bank can utilise to corral its risk activities. Following this, a number of framework components are explained and/or discussed in the context of their role and importance both within the framework, and within banks of differing sizes and levels of complexity.

4. The final sections focus specifically on the ALM components that represent significant challenges in the current environment.

5. Readers are requested to provide comments on the usefulness of this paper from the perspective of their own organizations. Feedback from readers is important to allow us to ensure articles and focus papers are both topical and relevant. Please leave your comments on the c-cube.

2 The Evolution of Risk Management

6. Emphasis and commitment to risk management historically intensifies when there is a crisis and wanes as markets progress through normal cycles. It has recently emerged, however, as a central issue in financial management—the main driver for this being a number of costly and highly publicised failures. Evidence suggests that the resulting losses can be attributed on the whole to failures in controls as well as management failures to detect or manage speculative, fraudulent or unauthorised transactions. Table 1 details some of the better publicised debacles.

Table 1: Risk Management Failures

Year	Organization	Known Losses	Product Involved	Type of Failure
1988	Hammersmith and Fulham (and other UK Authorities)	GBP600 million	Derivatives – Swaps	Authority / Documentation and Suitability
1994	Metallgesellschaft	US$660 million	Oil Hedging	Systems, control and management failure
1994	Proctor and Gamble	US$157 million	Structured notes	Speculation. Control failures
1995	Orange County	US$1.5 billion	Derivatives - swaps	Speculation. Authority / Documentation and Suitability
1995	Baring Brothers	GBP900 million	Options	Speculation. Fraud. Systems, control and management failure
1996	Sumitomo Corp	US$2.6 billion	Commodity Futures	Management oversight failure, Speculation – oversize positions
1998	Long Term Capital Management (LTCM)	US$4+ billion	Derivatives, debt and equity options	Speculation. Leverage, control and management failure
2001-2002	Enron	US$50+ billion	Corporate Governance / Financial Control	Fraud. Control, Board and Management failure
2002	Allied Irish	US$691 million	Currency Options	Unauthorised trading, fraud, control and management failure
2003	National Australia Bank	A$360 million	Derivatives, currency Options	Speculation. Systems, fraud, control, management failure
2007	Credit Agricole	US347 million	Credit market indices	Management and control oversight failure, oversize positions
2008	Societe Generale	US$7.2 billion	Futures and European equity market indices	Unauthorised trading, fraud, management and control failure.
2007-2008	Systemic Meltdown - Global Impact	US$400 + billion and counting	Structured and securitised product, credit, ABS, Funding/Liquidity	Speculation. Management, regulatory and rating agency failure, leverage, systems, and controls

Source: Independent Risk Consultants P/L.

7. Since the beginning of the 1980's in particular, financial institutions have been grappling with the risk management of an ever increasing range of new and variant products. Developments from this time onwards have revolutionised risk management through new quantitative techniques that allow banks to disaggregate, price, package, hedge and distribute risks which were previously undifferentiated, unmeasured and illiquid.

8. In 1988, the Bank of International Settlements (BIS) introduced the Basel Accord[1] which was designed to ensure minimum capital requirements for banks. It provided for the implementation of a credit risk management framework with a minimum capital standard of 8% by the end of 1992.

9. By the early 1990's a number of further risk management failures had occurred and this led to a specific G30 initiative in 1993 which reviewed activity in the global derivatives industry. The report, "Derivatives: Practices and Principles"[2], recognised and addressed concerns about the products and their uses and formulated recommendations about their proper management. Importantly, it dispelled many concerns about the products and placed the emphasis on identification, management, control and monitoring of the risks as a mandatory starting point in the provision of these valuable solutions to customers. Although the report was singularly focused on derivatives, it encompassed key aspects of risk management practice generally - these principles have come to be recognised as representing best practice.

10. As the implementation of the Basel Accord proceeded, it was recognised that numerous shortcomings existed in the framework and in June 2004, following extensive consultation with industry, the Basel II Accord[3] was published. This version superseded the 1988 Accord and aimed at ensuring that capital allocation is far more risk sensitive, establishing a framework for convergence of regulatory and economic capital. Additionally, it separates and quantifies risk into credit, market and operational risk components, establishing a viable structure and measurement system for each.

11. The events that began in 2007 with the sub-prime crisis have now forced regulators and financial service organizations globally to again re-examine and reassess risk management frameworks and processes.

3 Understanding risk in your organization

12. Establishing a framework to deal with risk is fundamental. In many cases, a significant cause of failure can be tied directly to an incomplete or absent framework for managing risk. Figure 1 below depicts a process for the development of a risk management framework. The steps identified are aimed at understanding the risks in the business and the importance or danger of each - knowing this is a prerequisite to quantifying the risk appetite of the organization in the context of the business strategy. This 'blueprint' for risk can then be formally merged with the organizational strategy. The outcome of these four steps can then be used to crystallise a governance and management framework for risk which in-turn can be used to fully develop implementation and management plans.

[1] Basel Committee on Banking Supervision, Bank of International Settlements. 1988. *International convergence of capital measurement and capital standards*. Basel.

[2] Global Derivatives Study Group, 1993, *Derivatives: Practices and Principles*, Group of Thirty – Consultative Group on International Economic and Monetary Affairs, Inc. - http://www.group30.org/pubs/pub_0901.htm

[3] Basel Committee on Banking Supervision, Bank of International Settlements. 2004, *Basel II: International Convergence of Capital Measurement and Capital Standards: a Revised Framework* (http://www.bis.org/publ/bcbs107.htm).

Figure 1: Development Process - Risk Management Framework

Source: Independent Risk Consultants P/L.

3.1 Know your business

13. Different organizations run different risks and have different risk profiles. Further, just because an organization is in the same industry and/or uses the same products or services does not mean it has the same risk needs. Size does matter and one size does not fit all – a proper diagnostic is required for each organization. For example, consider two small commercial banks with a similar product portfolio operating in different jurisdictions where capital markets development is at different stages. The limitations of the less developed market will mean that 'like' products represent higher risk. Similarly, customer profiles will be distinctly different reflecting inconsistent behaviours and resulting in different default characteristics. Such aspects not only have an impact on weighting the importance of each risk type in the portfolio, they also impact on the framework, operational and infrastructure requirements.

3.2 Analyse and rank your risks

14. Some risks are more difficult to manage than others and a process of assessing the level and importance to each individual organization is necessary. The same risks can represent a higher or lower exposure in different organizations. For example, the recent crisis has highlighted the vastly different risk profile attached to the re-financing risk of a banks' mortgage portfolio versus a non-bank. The strength of a commercial banks deposit franchise, with or without access to credit guarantees, means that the refinancing risk is significantly lower and less costly than that of a non bank, which in contrast tends to be reliant on the securitised markets for funding. This represents a competitive advantage for the banks, particularly in a high stress environment. Clearly the refinancing risk needs to be managed by both organizations; however, a non-bank would rank the importance and difficulty of managing the risk differently than a bank. Another important aspect is that risks within the enterprise are inter-related and cannot be viewed in isolation – understanding these relationships can assist in the identification of natural offsets.

3.3 Decide how much risk you should take.

15. Determining risk appetite is difficult. It is both a quantitative and qualitative process and should be undertaken considering; the current operating environment; the organizations cash-flow; strategy and earnings / balance sheet capacity. A bank should understand its business portfolio and the likely impact, under different scenarios (including high stress), of associated risks on earnings of each segment – both aggregated and disaggregated. The recent global crisis, which has brought a number of organizations previously considered impregnable to their knees, has reinforced the significance of understanding how risk levels change and impact during different operating environments.

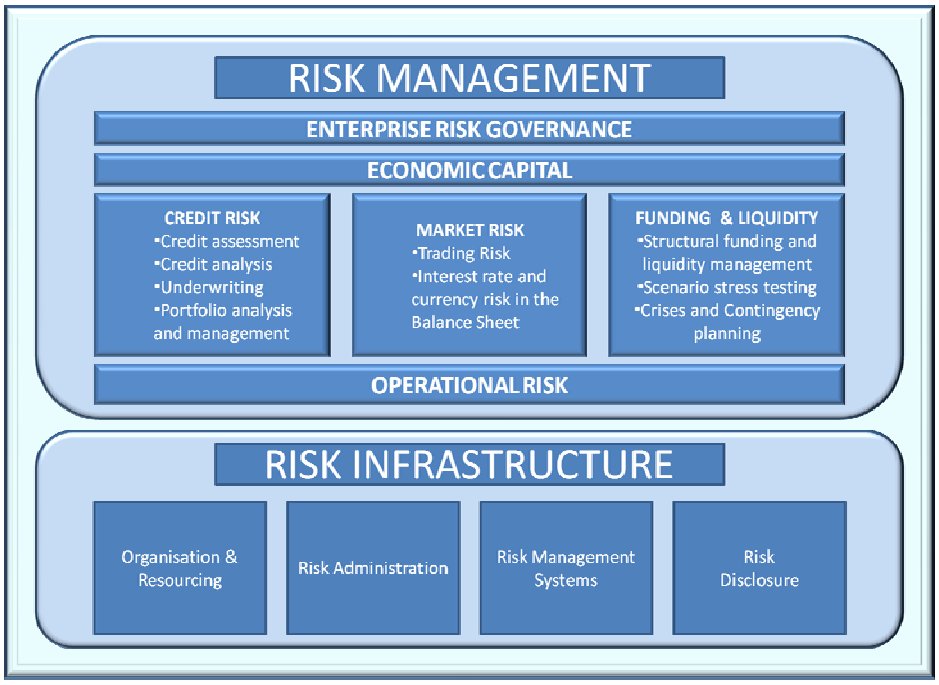
3.4 Make risk part of the organizational fabric.

16. Risk management is not a part time activity. It is a dynamic process that must be understood and acted on in virtually every part of the organization. The goal of creating a risk management culture is to create a situation where staff and management instinctively look for risks and consider their impacts when making effective decisions. Management of risks is generally a highly fragmented process in most organizations - by involving the enterprise in the process it becomes a less difficult task.

3.5 Formalise your framework

17. The work in analysing the organizations risks, ranking risks and quantifying risk appetite is prerequisite to establishing the framework and governance structure. The final components of the framework will depend on the nature of the underlying business - in the case of a bank; Figure 2 below shows the typical components.

Figure 2 - Generic Bank Risk Management Framework



Source: Independent Risk Consultants P/L.

4 The Bank Risk Management Framework

4.1 Governance

18. The vast majority of banks lack an enterprise-wide view of risk. Organizational silos, decentralisation of resources and decision making, poorly integrated systems, inadequate forecasting and lack of transparent reporting represent the main barriers. In the past decade however, as a result of regulatory focus through Basel II as well as publicised risk management failure, banks have increasingly applied resources to developing risk management capability. The majority of banks of all sizes have set up a governance structure to span the main risks. The typical structure is based on a distributed risk function. This structure generally consists of; the

board of directors; various committees at board and management levels (depending on the scale and sophistication of the bank); a centralised risk management function - usually responsible for policy formulation and oversight; and risk management functions located in each business responsible for the day to day oversight of risks. Reporting relationships vary, however, a test of practical independence is usually applied. Appendix 'A' shows an example of a typical structure.

19. In a robust governance structure, a board should formalise its responsibilities by establishing a risk management committee 'Charter' detailing, its purpose; composition; meeting schedule / timetable, agenda and approval requirements; reporting requirements; and responsibilities generally for each risk category in the enterprise. Appendix 'B' provides an example of a Charter for a large regional bank.

4.2 Risk Management Structure

4.2.1 Market Risk

20. Market risk, which describes the sensitivity of the value of positions to changes in market prices and/or rates, requires a separate framework for oversight and management. Different methods of modelling are used for traded market risk versus non-traded risk. Traded market risk is modelled and calculated using a Value at Risk (VaR) methodology. VaR facilitates a number of functions in the market risk area including; generation of management information and oversight; establishment of trading limits and control of trading operations; performance evaluation; asset and resource allocation including hedging decisions; and regulatory reporting and risk oversight. Recent market events have brought into question the validity of certain underlying assumptions in the VaR methodology. For example, the model assumes that positions can be hedged or liquidated over a specified time horizon. The liquidity constraints in markets during the recent crisis invalidated this assumption—VaR accuracy is questionable when dealing with illiquid instruments. It has not been considered a substantial problem historically but has become a major issue with the extent of volatility during the recent turmoil and emphasises the need to supplement modelling activities with adequate stress testing of portfolios.

21. Under the Basel II Accord, market risk can be measured using differing approaches. The more simplistic, 'Standardised Approach', is a formula-based model while the 'Internal Model Approach', requires extensive data collection, systems and quantitative expertise. Capital requirements under the Standardised Approach however, are prospectively higher. Banks need to carefully consider the cost and benefits associated with both approaches as the Internal Model approach is time consuming and expensive and provides, arguably, little incremental benefit for a smaller and less complex organization. The same point is applicable to credit and operational risk categories.

4.2.2 Credit Risk

22. While there have been many reasons why financial institutions have faced difficulties historically, the major causes of serious banking problems are directly related to credit standards for borrowers and counterparties. A credit risk framework focuses primarily on; the measurement of credit risk; credit controls and risk administration, including monitoring compliance with credit risk limits; and, establishment of regulatory / economic capital required to support credit risk. The Basel II framework provides for the discrete modelling and measurement of credit risk. The shortcomings in the 1988 Basel Accord have been addressed with an internal ratings based approach (both

Foundation and Advanced) allowable under Basel II. As with Market risk, a Standardised approach is also allowable - banks and supervisors can select approaches that are most appropriate for their operations and financial markets infrastructure.

23. Moving beyond the Standardised approach requires heavy investment in data sourcing and data quality, the cost of which is arguably offset by the reduced requirement for capital support. However, banks should not just look at this aspect when determining the approach to be adopted. They should also consider the benefits from enhanced data and information that can be leveraged to serve the business.

4.2.3 Liquidity Risk

24. The concept of liquidity is increasingly important in managing financial risk. It is driven by; the structure and depth of markets; volatility of market prices/rates; the presence of traders willing to make markets and commit capital to support trading; and, trading / leverage strategies deployed. It has historically been thought of as associated with funding, however, it can be separated into two distinct risk types – Funding Liquidity Risk and Trading Liquidity Risk. In September 2008 the BIS released a detailed guidance document on liquidity management – "Principles for Sound Liquidity Risk Management and Supervision[4]". The document provides a number of guidance principles around; governance; measurement and management; public disclosure; and, the role of supervisors. It is the most comprehensive regulatory/supervisory response on the subject to date.

4.2.3.1 Funding Liquidity Risk

25. This refers of course to the ability to meet funding obligations by either financing through sale of assets or by borrowing. Perhaps the most poignant example is the recent crisis-driven drying up of access to debt securities markets globally which forced governments in most jurisdictions to provide massive 'window' facilities to market participants. At the strategic level, most banks will manage funding liquidity risk through the ALM process and this is looked at in the sections on ALM below. In many smaller banks, however, it can be the responsibility of the trading department that also has day to day responsibility for operationalising the strategy.

4.2.3.2 Trading Liquidity Risk

26. This risk refers to the ability to continually enter into market transactions and is also referred to as market liquidity or asset liquidity risk. A good example of the impact of this risk was demonstrated during the recent crisis when interest rate derivative spreads increased markedly with the drying up of product availability in combination with the ongoing need for hedging transactions. It resulted in a dramatic increase in costs, threatening economic viability. A central aspect during the period was the contagion effect which impacted on multiple product groupings and underlined the need to fully understand the risks associated with the interrelated nature of financial service products.

4.2.4 Operational Risk

27. Under the Basel II Accord, operational risk is defined as "...the risk of loss resulting from inadequate processes, people and systems or from external events." The Accord also recognises however that the term "operational risk" can include different meanings, and therefore permits banks to use their own definitions provided the key elements of the Basel II definition are included. While banks have always engaged in operational risk management, the Basel II related

[4] Basel Committee on Banking Supervision, Bank of International Settlements. 2008. *Principles for Sound Liquidity Risk Management and Supervision* (http://www.bis.org/publ/bcbs144.htm).

rules introduce new dimensions to this practice in the form of explicit capital requirements and corresponding changes in supervisory oversight.

28. The management of operational risk requires systems capable of identifying, recording and quantifying operational failures that may cause financial loss. The systems are essentially tracking processes that monitor the behaviour and performance of existing systems and processes. The essential elements include 1) the ability to track and monitor performances of specified operational processes and systems, 2) maintenance of databases of operational loss experience history, and 3) capacity to provide exception reporting or initiate actions to enable intervention to reduce operational risks.

5 Asset and Liability Management (ALM)

29. There are different organizational and governance models that guide the management of bank asset and liability activities. The models reflect fundamentally different risk philosophies that tend to evolve with the growing sophistication and depth of financial markets together with the position and activities undertaken by a bank in the market. The terms 'ALM unit' and 'treasury unit', can be confusing as they are often used by organizations who assign different responsibilities to them - this will be explained below.

5.1 Key aspects that influence a banks approach

30. The evolution of models is driven by differing philosophies about the role of the treasury or the ALM unit and banks in markets at different stages of development often regard the treasury unit differently.

31. In emerging markets the treasury function is usually simplistic and a support function mainly focused on liquidity management and basic foreign exchange activity. In these banks, it is not uncommon to have a prohibition on involvement in more sophisticated capital markets transactions such as derivatives due to lack of knowledge and suspicion about the instruments. Such markets can suffer from poorly developed capital markets that provide little capacity to offset the risks assumed from the customer franchise. The result is often that these banks are slow to evolve and run risks, without knowing it, which can threaten their very survival.

32. In developing markets the treasury function usually begins to take on more structure, more activities and a broader mandate. At the simpler end of the spectrum it can assume full balance sheet management responsibility, involving itself in more complex analytics and hedging activities. At the more complex end it can assume trading and market making responsibilities for a range of capital market products that are used in hedging but also are provided to customers. This can often be referred to as an 'integrated treasury function', with profit making as well as hedge management the central themes.

33. In developed markets the model usually evolves by separating out the trading and market making functions into a more customer centric unit such as a capital markets or institutional banking division, with a subsequent refocusing of the core ALM functions on more detailed analysis, and management of the banks' assets, liabilities and capital base. Treasury becomes more of a service centre in these banks, providing assistance and support with pricing and analytics to customer facing divisions. The ALM or balance sheet can often be managed aggressively through the use of

derivative contracts. Funds transfer pricing mechanisms are used extensively to create economic transparency and to immunize business units to risk.

34. In all models the ALM function reports to either the CEO / CFO with the CFO generally having the day to day responsibility for the ALM core functions. Under all models it is important to establish a clear understanding of activities and risk thresholds in the Treasury function and ensure the risk framework is aligned to the operating structure and market realities. Establishing a governance structure within which the board of the bank is fully informed and cognisant of the risks being run is a critical and mandatory component.

35. It is in the more developed markets that the Chief Risk Officer function has developed and come to represent the single independent point of oversight both internally and externally.

5.2 Focus on some key ALM activities

36. Successful ALM units create a properly aligned risk and return management process. The right mix between skills and risk appetite must be identified, expected outcomes of activities known and appropriate metrics established. The approach adopted needs to be aligned to the realities of the market the bank is operating within and to its desired risk appetite.

5.2.1 Mismatch Management and Performance Measurement

37. A bank needs to decide whether it wants to take a relatively neutral approach to ALM risks or is prepared to take a more aggressive approach and target higher long term earnings and an increase in economic value. Irrespective of the choice made, a bank needs to realise that the right level of skills and resources need to be committed to support the function. Failure to do this can result in a poorly managed operation characterised by volatility in; core earnings/margin; economic value, and; unpredictable economic results.

38. The mismatch position of the balance sheet represents the interest rate and liquidity risk profile inherent. Assuming a single portfolio without hedges, a large and well diversified bank, with transactions weighted broadly across all market segments, will find that its balance sheet will naturally take on countercyclical characteristics as the business environment consolidates through the economic cycle. This makes sense as the bank is effectively providing customers with solutions they are demanding as they operate in the external environment. The market itself will also provide limitations and one of the areas where this can manifest strongly is on the liability side of the balance sheet. Various techniques are used to examine the mismatch in a bank's balance sheet and it can be a difficult process if not supported with adequate systems. Depending on systems and analytical support the ALM process will undertake a number of analysis designed to identify; static and dynamic mismatch; sensitivity of net interest income; and, market value under multiple scenarios -including under high stress.

39. The majority of banks set net interest income (NII) limits as a main measure of performance with the more advanced banks also using market or economic value as a secondary measure. NII has become the industry benchmark simulation tool because; it is relatively easy to understand and implement; it's a single period measure that does not require many assumptions, and; it is easy for investors to relate to because it is directly linked to reported financial results. On the negative side, it is limited as it does not provide a full view of the risks run by a bank or reflect fully the economic impact of interest rate movements. Market value or economic value simulations on the other hand, offer a more complete assessment of the risk being run but require significantly more

detailed analysis which is out of reach of many banks at this point. The process requires multiple assumptions that are difficult to form in some cases and is less intuitive and more difficult to understand. Notwithstanding the difficulties of the latter, both metrics are important in the measurement and management of embedded risk in banks. In less developed ALM units, the time it takes to collect and analyse information can render much of it useless for active management as by the time it is available markets have moved making hedging ineffective.

40. Access to timely and accurate data is critical in support of any form of ALM activity.

5.2.2 Funds Transfer Pricing (FTP)

41. The funds transfer pricing system has become a fundamental ALM tool in a bank. It creates the ability to immunize business units from risk and provides the basis for economic and product transparency.

42. The process of FTP is designed to identify interest margins and remove interest rate and funding or liquidity risk. Looking at it from the business unit perspective, it effectively locks in the margin on loans and deposits by assigning a transfer rate that reflects the repricing and cash flow profile of each balance sheet item – it is applied to both assets and liabilities. From the ALM unit's perspective, it isolates business performance into discrete portfolios that can be assigned individualised metrics and facilitates the centralisation and management of interest rate mismatches. A by-product is that it effectively allocates responsibilities between the organizational business units and the treasury department.

43. In more developed banks, the FTP mechanism can also be used as a tool to assist with management of the balance sheet structure with FTP rates adjusted to either encourage or discourage product and customer flows. The associated analytical process leads to greater understanding of a bank's competitive advantage, assisting with asset allocation and protection of the franchise. Similarly, in smaller and/or less developed banks it is of equal value as both a management and strategy tool.

44. The methods used by banks are generally consistent - FTP rates are structured to include both interest rate and funding liquidity risks with the derived transfer yield curve constructed to include appropriate premiums. Such premiums should capture all elements associated with the banks funding cost. These should include the cost of items such as; holding liquidity reserves; optionality costs, where pre-payment rights exist; term funding program costs; and, items such as basis risk.

5.2.3 Liquidity Management

45. The main liquidity concern of the ALM unit is the funding liquidity risk embedded in the balance sheet. The funding of long term mortgages and other securitised assets with short term liabilities (the maturity transformation process), has moved to centre stage with the contagion effect of the sub-prime debacle. Both industry and regulators failed to recognise the importance of funding and liquidity as contributors to the crisis and the dependence on short term funding created intrinsic flaws in the business model. Banks must assess the buoyancy of funding and liquidity sources through the ALM process.

46. Banks are in the business of maturity transformation to meet their customers' requirements and these result in liquidity, interest rate and currency mismatches which need to be managed. ALM

units have traditionally analysed and 'managed' liquidity within pre set limits; however it is only the recent crises that have brought its true importance into focus. Failure to manage effectively can have dire results but the events of recent times have demonstrated that liquidity impacts can be cataclysmic to a bank.

47. Like all areas of risk management, it is necessary to put a workable framework in place to manage liquidity risk. It needs to look at two aspects: 1) Managing liquidity under the business as usual scenario, and 2) Managing liquidity under stress conditions. It also needs to include a number of liquidity measurement tools and establish limits against them. Some of the tools that have become industry standard are shown in Table 2.

Table 1 - Selection of Liquidity Measurement Tools

Liquidity Management Tool	Description / Aim
Static Funding Gap	Defines the short fall in maturing liabilities required to service maturing assets– it is usually calculated on a maturity bucket basis and is calculated as the net asset position over total liabilities.
Dynamic Cash Flow Gap	This includes a measurement based on maturing assets and liabilities plus assumed marketable asset liquidation over a given period.
Liquidity Asset Ratios	This is the ratio of liquid assets to total liabilities with liquids defined to include items such as cash and cash equivalents, trading account securities, repos investments into government securities, etc
Concentration Ratios	This is an important ratio that reassures the funding from a particular source compared to assets /liabilities or capital.
Liquidity Stress Measurement	A number of ratios can be examined here looking at multiple low stress and high stress scenarios

Source: Modified from GARP 2008 Best Practices presentation.[5]

48. At the governance level, boards need to recognise liquidity risk as the ultimate killer. This means a board needs to clearly articulate the risk tolerance of the organization and subject the balance sheet to regular scrutiny. Guiding principles need to be included as part of this process. The following 5 principles are valuable:

    1. Diversify sources and term of funding – concentration and contagion were the killers in the recent crisis.
    2. Identify, measure, monitor and control – it is still surprising that many banks do not fully understand the composition of their balance sheet to a sufficient level of detail to allow for management of the risks.
    3. Understand the interaction between liquidity and other risks – e.g. basis risk – the flow on impact of an event in one area can be devastating to others.
    4. Establish both tactical and strategic liquidity management platforms – keep a focus on both the forest and the trees.
    5. Establish detailed contingency plans and stress test under multiple scenarios regularly.

[5] GARP 2008 – Risk Management Convention and Exhibition, 27 February 2008, *Best Practices in Asset, Liability and Liquidity Management*, McKinsey Risk Management Practice.

6 Infrastructure Implications

49. The infrastructure underpinning risk management and ALM has many components but the two that consistently create issues for Banks are technology and people. As banks increasingly focus on improving risk management practices they realise the absolute criticality of these two areas.

6.1 Technology

50. Most banks know they have problems with IT systems. Large organizations that compete in rapidly evolving markets are held hostage to the out dated systems that run their business. The issue for risk managers is that most systems are unable to cope with the demands for clean, accurate and timely data used in the risk management analytical process. Fortunately, in recent years there has been recognition that technology can be a key competitive differentiator and superior systems are seen by the customer facing business units as the basis of competitive advantage. As a result there has been a substantial growth in proven off-the-shelf software and it exists for almost every industry application – this makes the task of legacy system replacement substantially easier than in the past. Nevertheless, it is a complex and costly process for even the smaller bank.

51. The particular needs of the risk management function should not be underestimated. The risk management of complex portfolios would not be feasible without the availability of systems designed to provide information on a near real time basis. In developing and developed markets, banks are increasingly involving themselves in higher trading volumes, a broader range of products, and complex products that require increased risk management and controls. Specialised systems are essential to exercising risk oversight of all these activities. The selection and implementation of risk management and technology systems carries the same challenges as any other large technology project and requires an appropriate governance structure to aid success.

52. There are multiple areas that can be identified as success factors but 4 in particular represent the foundation. Table 3 below looks at these briefly.

Table 2 - Technology Success Factors

Success Factor	Description
Senior Level Commitment	There has to be a board level understanding and commitment to the technology initiative. Budgets need to be in place and there needs to be clarity about the challenges and difficulties in executing a program that spans the enterprise. The commitment needs to be well communicated down the line including expectation of divisional commitment and support necessary to get the job done. Too often, large projects fail because the extent of the work required was not well enough understood, communicated and committed to.
Alignment with Strategic Direction	The technology initiative needs to be aligned with the strategic goals of the bank. While all banks require robust systems, not all need the same level of analysis. Smaller institutions that are less complex, and do not foresee substantial broadening of activity of transaction complexity, do not need to implement as complex and costly system as a large diverse bank. Scalability is often touted by vendors as the answer to this; however, a bank needs to be certain of the appropriateness and cost implications of an intended solution.
Appropriate Systems Architecture and Application Selection	It is desirable to establish a clear and defined systems architecture within which individual systems can be implemented. This ensures that costs are contained and the right level of support is devoted to ensuring inter-changeability of information and data. In today's environment a bank of any size should complete a detailed diagnostic on its systems architecture and application portfolio and establish a road map which can be used to centre post development.
Adequacy of Support and Resourcing	Adequate support needs to be given to each aspect. This does not just include the budget and reporting process. Professional project management methodologies are required and the structure needs to be resourced with qualified and competent business and technology people. The full stakeholder group needs to be identified and commitment enlisted where necessary.

Source: Independent Risk Consultants P/L.

6.2 People

53. As business and control environments have become more complex, the demand for more technically qualified quantitative risk management professionals has intensified. Competitive pressures have pushed costs for good people higher and higher over recent years with a focus on decomposing and disaggregating the business into components that can better analysed and managed. Unfortunately, the lessons learned from the recent crisis have highlighted the need to not just focus on the bits – there needs to be an understanding of the complex relationships and inter-relationships not only between the component parts of the bank, but also between those part and the external environment. A key failure in the risk management processes leading into the current crisis was the almost singular focus on the component parts of management and this gave participants a false sense of security as they were not seeing the potential contagion effects or systemic risk that was the ultimate fallout.

54. The implication for the people portfolio is significant. Although quantitative skills will remain very much in demand, there has been a realisation that experience and knowledge of markets and market behaviours is equally critical. The ability to understand and/or forecast the likely impact of a series of complex unrelated and interrelated events on the business environment is not simply a quantitative process that can be solved by algorithms that are becoming ever increasingly

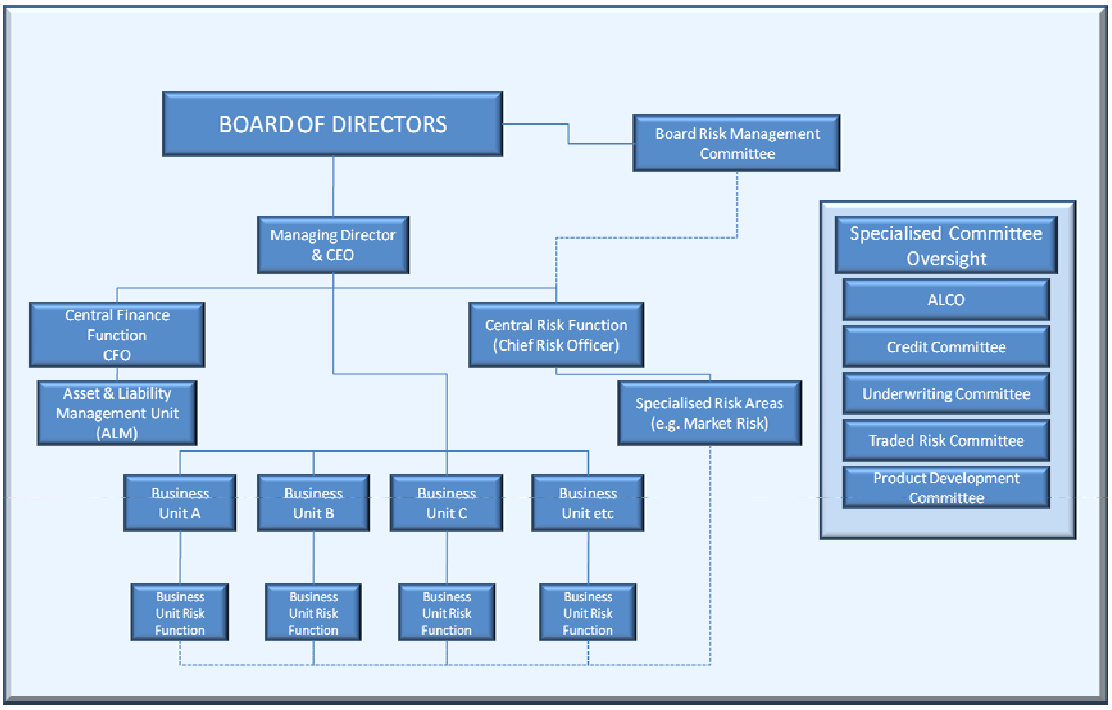
complex. There is a balance of qualitative factors that influence market outcomes. As a result there has been a shift within banks to locate individuals who can provide a depth of additional market based experience. With the realisation that markets will continue to provide events that will challenge the risk management practices of banks, the trend towards a more balanced business/quant people mix in risk management disciplines will continue.

7 Summary

55. The crisis that began with the subprime mortgages and has now become a global meltdown of markets, banks and other institutions should leave no doubt that effective risk management and ALM in banks is not an optional function. All banks irrespective of size need to develop a strategy and implementation plan for both areas that is properly aligned to the individual banks strategy. Banks need to assess the fundamentals of their own operations and environment to do this – there is no one solution or size that fits all.
56. A practical starting point is to construct a framework for risk management considering the detail of the business activities the bank is involved in, analysing and ranking the risks involved in the various businesses and deciding how much risk the bank should take. While the 'headline' categories in the risk management framework will be similar for all banks, the needs in both analysis and management will vary considerably for banks of different sizes and operating in markets of different stages of development. The program to build effective risk management in a bank must be sponsored and overseen by the highest levels of the bank and governance and oversight structures established and embedded in the organizational fabric. This commitment needs to be backed up with a range of additional commitments to ensure budget, technology and people resources are sufficient to execute the implementation plans.
57. A final, critical point to note is that risk management and ALM are not static activities. Both continue to evolve and new aspects are presented that challenge the organizations capacity. Regular board oversight together with a periodic and detailed review process has to be built into the framework to ensure focus remains appropriate and relevant.

Appendix A: Governance and Structure—The Distributed Risk Function

Figure 1: The Distributed Risk Function



Source: Independent Risk Consultants P/L.

The above chart shows a typical distributed risk function structure in a large and diverse bank. In small organizations, the CFO function in often responsible for enterprise risk activities and committee oversight may be conducted through a smaller number of committees or only by the ALCO. There is an increasing trend in smaller organizations, however, for more transparency in the risk activities overseen by the CFO with separate independent risk oversight often established to provide the board with the desired level of confidence

There has also been an increasing trend to formalise board risk responsibilities through a specialised risk management committee that works with the CEO and Central Risk Function to establish and approve policy and tolerance for risk.

Appendix B: Board Risk Management Committee Charter

Board Risk Management Committee Charter 'ABC Bank'[1]

Purpose

1.1. The purpose of the 'ABC' Bank Risk Management Committee ('the Committee') is to oversee the risk profile and approve the risk management framework of ABC Bank and its controlled entities ('the Group') within the context of the risk-reward strategy determined by the Board of Directors ('the Board').

1.2. To fulfil its responsibilities the Committee has power delegated by the Board to set risk appetites, approve frameworks, policies and processes for the management of risk, and accept risks beyond the approval discretion provided to management.

Composition

1.3. The Committee membership and the Chairman of the Committee will be as determined from time to time by the Board of ABC Bank. The Committee will consist of at least three Directors, not more than one of whom shall be an executive Director. Each of the non-executive members will be independent directors and free from any business or other relationship that, in the opinion of the Board, would materially interfere with the exercise of their independent judgement as a member of the Committee. Other Directors of the Board are entitled to attend Committee.

1.4. Should the Chair of the Committee be absent from any meeting of the Committee, the members of the Committee present at that meeting shall appoint one of their number to be chair of that meeting.

Meetings

1.5. The Committee will meet four times annually and more frequently if required.

1.6. The Committee may request any officer or employee of the Group, outside legal counsel, the external auditor or any person or group with relevant experience or expertise to attend meetings of the Committee or to meet with any members or consultants to the Committee.

1.7. A quorum of any meeting will be two members. The Secretary of the Committee will be the Group Secretary and General Counsel or a designated representative.

1.8. The agenda and supporting documentation will be circulated to the Committee members in advance of each meeting. The Secretary of the Committee will circulate minutes of meetings to members of the Committee, for approval. Approved minutes will be submitted to the Board.

1.9. Where approvals are granted outside a meeting of the Committee, a report is to be provided to the next meeting of the Committee.

1.10. The Committee may adopt any rules and regulations considered appropriate for the conduct of its affairs, provided that they are consistent with the ABC Bank Constitution, this Charter (as amended from time to time), or any resolution of the Board.

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[1] This example Charter is a 'sterilized' version of an actual 'Board Risk Management Charter', adopted and implemented by a large regional bank, with global interests, that is based in the Asia/Pacific region (Source: Independent Risk Consultants P/L).

Reporting

1.11. The Committee will regularly update the Board about Committee activities and make appropriate recommendations. The Chairman of the Committee will report to the Board, at the Board meeting next following a meeting of the Committee, on any matters under consideration by it within its Charter.

1.12. The Committee will refer to the Board Audit Committee any matters that have come to the attention of the Committee that are relevant for the Board Audit Committee.

1.13. The Committee will provide relevant periodical assurances to the Board Audit Committee.

1.14. At the discretion of the Chairman and members of the Committee, matters considered to be of major importance will be referred to the Board for its attention.

Responsibilities

1.15. The Committee will recommend to the Board the parameters of the Group's risk/reward strategy, monitor the alignment of risk profile with risk appetite as defined in the Board Risk Appetite Statement and with current and future capital requirements, and oversee risks inherent in the Group's operations. Such oversight will include, but is not restricted to, the following elements:

1.15.1. Credit Risk

a) Review and approve the framework for the management of credit risk.

b) Review the monitoring of the risk profile, performance and management of the Group's credit portfolio.

c) Review the development and ongoing review of appropriate credit risk policies.

d) Determine, approve and review the limits and conditions that apply to the Chief Executive Officer, the Chief Financial Officer, the Chief Risk Officer and any other officers of the Group to whom the Board has delegated authority.

e) Approve credit facilities and equity underwriting exposures outside the authority delegated to management.

f) Review the Group's bad debt performance.

g) Review and approve material changes, as determined by the Chief Risk Officer, to the provisioning methodology for the Group.

1.15.2. Market Risk

a) Review and approve the framework for the management of market risk.

b) Review the monitoring of the Group's market risk performance and exposure against limits.

c) Review the development and ongoing review of appropriate market risk policies.

d) Review and approve market risk limits including but not limited to Value at Risk Limits and Net Interest Income at Risk Limits.

e) Review structural interest rate risk positions for the Group.

1.15.3. Liquidity Risk

a) Review and approve the framework for the management of liquidity risk.

b) Review the monitoring of the Group's liquidity position and requirements.

c) Review the development of appropriate liquidity risk policies.

d) Review and approve the funding plan for the Group.

e) Review the monitoring of the Group's funding plan and funding requirements.

1.15.4. Operational Risk

a) Review and approve the framework for the management of operational risk.

b) Review the monitoring of the performance of operational risk management and controls.

c) Review the development and ongoing review of appropriate operational risk policies.

In relation to compliance risk:

d) Review the compliance risk processes that are in place to anticipate and effectively manage the impact of regulatory change on the Group's operations.

e) Oversee compliance by the Group with applicable laws, regulations and regulatory requirements that may impact the Group's risk profile.

f) Discuss with management and the external auditor any correspondence with regulators or government agencies and any published reports that raise issues material to the Group.

g) Review the procedures for the receipt, retention and treatment of complaints received by the Group including whistleblower concerns received from officers of the Group.

1.15.5. Reputation Risk

a) Review the monitoring of the performance of reputation risk management and controls.

1.15.6. Other Risks

a) Review the monitoring of the performance of other risk types as appropriate.

1.15.7. Other responsibilities

a) Monitor changes anticipated for the economic and business environment, including consideration of emerging trends and other factors considered relevant to the Group's risk profile.

b) Review and update the Charter at least annually and recommend changes to the Board for approval.

c) Retain independent legal, accounting or other advisors to the extent the Committee considers necessary.

Approved by the Board on _____ (date)