

# Operational Risk Management Framework at Banks in India

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*Operational risk is the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. In recent years, failure of the banks due to operational risk has compelled the policymakers (Basel and the RBI, in India) to devise prudent risk management mechanism. In this regard, the RBI had issued guidelines on operational risk management on October 15, 2005. This paper is designed to study the implementation of the risk management framework and operational risk management framework by the commercial banks. To achieve the objective, a primary survey was conducted. The results show that irrespective of sector and size of bank, the risk management and the operational risk management framework of banks in India are on the right track and they are based on the RBI's guidelines issued in this regard. Many banks have set up risk management committees for the management of risks (credit, market, and operational). Credit risk is the most important risk faced by the schedule commercial banks in India. In order to manage the operational risk, many banks have designed operational risk management framework on the lines of Basel Accords. The 'board of directors' and 'operational risk management committees' are responsible for the management of this risk in many banks, and the task of identification and assessment of operational risk in many banks is based on the experience of bankers. As per the RBI guidelines, banks in India are following Basic Indicator Approach (BIA) for operational risk capital charge calculation.*

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## Introduction

Operational risk is a result of failure of operating system in a bank due to certain reasons such as fraudulent activities, natural disasters, human errors or omissions, use of highly automated technology, the growth of e-commerce, large-scale mergers and acquisitions and the emergence of banks as very large volume service providers. Operational risk has proved to be an important cause of huge financial losses in banks and financial institutions, the most recent one being the loss suffered by Societe Generale of €7.1 bn. The financial industry, which has developed standard methods to measure and manage market risk and credit risk, is now focusing on operational risk.

Operational Risk (OR), which was initially understood as every type of unquantifiable risk faced by a bank, has now been specifically defined by regulators and recognized by banks to be critical in shaping their risk profile. This recognition has led to an increased emphasis on the importance of sound operational risk management in banks and financial

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institutions. However, management of operational risks is not a new idea. What is new is the organization of the components of operational risk in a coherent and structured framework to facilitate efficient management of the same.

In fact, Basel has defined operational risk as “the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events”. This definition of operational risk alone hints that the scope of this risk class may be the first challenge. It demands understanding of the nature of various risk types within each business lines. Basel definition of operational risk seeks to identify why a loss happened and at the broadest level includes the breakdown of operating system in a bank. In fact, Moody’s estimated that the 20 largest publicized ‘risk events’ in the past decade cost the banking sector a cumulative \$23.5 bn. Major loss events, directly due to internal process failure such as Barings (1995, \$1.3 bn), Allfirst (2002, \$750 mn) and NAB (2004, A\$360 mn) are today classified as OR events, even though the ultimate nature of the loss is related to market risk.

Thus, a clear appreciation and understanding by banks of what is meant by operational risk is critical to the effective management and control of this risk category. It is also important to consider the full range of material operational risks faced by banks and capture all significant causes of severe operational losses. The implications and importance of risks from operations has to be understood at the grass root level for effective operational risk management for the bank as a whole. All this calls for a standardized operational risk management framework, which includes governance, risk assessment, event collection, key risk indicators, capital modeling and reporting. Thus, keeping in view the seriousness of the operational risk, the present study is devoted to understand the concept of operational risk and its relation to the normal day-to-day functioning of the bank. An attempt has also been made to study the risk management framework of the banks in general.

## **Review of Literature**

Basel Committee (2004) outlines the operational risk management other than the credit and market risks. The committee believes that a rigorous risk mitigation and control environment, appropriate risk measurement and pricing techniques, sound internal controls, audit assurance and disclosure would be the factors for effective operational risk management in banks. Some of the foreign and indigenous studies pertaining to risk management and operational risk management in the banking industry are as follows:

Pyle (1997) discusses why risk management is required. He outlines some of the theoretical underpinnings of contemporary bank risk management, with an emphasis on market and credit risks. He concludes that managers need reliable risk measures to direct capital to activities with the best risk/reward ratios. They need estimates of the size of potential losses to stay within the limits imposed by readily available liquidity, by creditors, customers and regulators. They need a mechanism to monitor positions and create incentives for prudent risk-taking by divisions and individuals.

Andrew (1999) found firm-wide risk management as a complex and multifaceted process, which varied among organizations. It is viewed as an ongoing process requiring continual observation, planning and even modifications if the need arises. The author concludes that current risk management practices focus almost on the statistical aspect of risk.

Joint Forum's Working Group (2003) conducted a survey of 31 firms (banking, insurance, and securities sector) from 12 countries to observe two important trends: (i) greater emphasis on the management of risk on an integrated firm-wide basis; and (ii) related efforts to 'aggregate' risk through mathematical risk models. The study concluded that the efforts firms had been making to develop more systematic and integrated firm-wide approaches to risk management should continue to be strongly encouraged by the regulatory and supervisory community.

Pandey (2002) examined the importance of integrated risk management or enterprise risk management in the organization. He highlighted the various types or dimensions of risks such as market risk, liquidity risk, credit risk, settlement risk, operational risk, legal risk, strategic risk, regulatory risk, interest rate risk, currency risk, and commodity risk and the techniques of measurement of risk like value-at-risk by using variance-covariance method, historical method and Monte Carlo simulation method. His study concludes that enterprise resource management is the process of optimizing the manner of risk taking.

Raghavan (2003) finds that the objective of risk management is not to prohibit or prevent risk-taking activity, but to ensure that the risks are consciously taken with full knowledge, clear purpose and understanding so that they can be measured and mitigated. He expresses that the risk management techniques, like Risk Rating Models, i.e., Altman's Z Score, Credit Matrics, Duration Gap Analysis, Simulation, Value at Risk, to anticipate and prevent the risk taking activity are of main consideration for banks.

Hanc (2004) made an attempt to study the future of the US banking in order to project the likely trends in the structure and performance of banking industry over the next five to ten years and to anticipate the policy issues that would confront the industry and the regulatory community. The study also emphasized the need for financial and operational risk management system in today's competitive and complex environment. The author concludes that financial risk models are being implemented in response to both the business need for risk management and a presumption that Basel II will eventually be implemented.

Leippold and Vanini (2005) developed a framework for qualification of operational risk-based on network with functional dependencies that represent workflows for business activities. The results of the study show that the usual intuition gained from market and credit risk does not apply to quantification of operational risk. The authors qualify the interdependent operational risk costs, impact of altering the network architecture. They are of the opinion that their model serve as a valuable decision tool for a bank's operational risk management.

According to Alan Steif (2006), the Basel II Accord has generated urgency in the risk management community to model operational risk Value-at-Risk (VAR). The predominant methodology for computing operational risk VAR is the loss distribution approach. The author in the paper discusses the scaling behavior of VAR as a function of time horizon within the loss-distribution approach. In particular, it is shown that for sufficiently high frequency operational loss data VAR will scale linearly with time horizon. This fact allows the practitioner to optimize VAR computation.

Falko and Kalkbrener (2007) state that the Advanced Measurement Approach in the Basel II Accord permits an unprecedented amount of flexibility in the methodology used to assess operational risk capital requirements. Their study presents the capital model developed at Deutsche Bank and implemented in its official economic capital process. The model follows the Loss Distribution Approach (LDA). The authors presented the main quantitative components, i.e., use of loss data and scenarios, frequency and severity modeling, dependence concepts, risk mitigation and capital calculation and allocation.

Janakiraman Usha (2007) introduced the concept of operational risk, reviewed the quantitative framework for operational risk under Basel II and outlined the key challenges and varying practices in the development of an operational risk framework. The author concludes that operational risk is not well understood as a concept. The flexibility given to banks by the regulator under Basel II Accord for developing the measurement framework under the advanced approaches has resulted in varying practices followed by banks in managing and measuring operational risk.

Jobst (2007) provided a view of current regulatory framework of operational risk under the New Basel Capital Accord with a view to initiate a critical debate about the influence of varying loss profiles and different methods of data collection, loss reporting, model specification on the reliability of operational risk estimates and the consistency of risk sensitive capital rules. The author found that parameter uncertainty of different risk models as well as cross-sectional variation of timing and frequency of reported loss event could adversely affect the generation of consistent risk estimates. Thus, they provide insights for effective capital rules and prudential standards for operational risk measurement.

On making the review of the previously conducted studies, it is clear that a majority of the studies focused on risk management practices in banks belong to foreign countries. Furthermore, those concentrate on Indian banking provide conceptual framework. Moreover, no bank-specific study was conducted in India. Thus, the present study is an attempt to study the implementation issues of Basel II in India, by considering bank's framework of risk management in general and operational risk management in particular.

### **Research Objective and Methodology**

This study is undertaken primarily to examine the framework of risk management in general and operational risk management in particular, of Scheduled Commercial Banks

(SCBs) in India, which is followed in pursuance to the Basel Accords and the RBI guidelines. An attempt is also made to examine the size and ownership effect on the operational risk management practices in banks. In sync with the above-mentioned objectives, the study intends to test the following null hypotheses:

- (i) *There is no difference between operational risk management practices of large banks and small banks; and*
- (ii) *There is no difference in operational risk management practices of Public Sector Banks (PSBs) and Private Sector Banks (PBs).*

As the concept of risk management in the emerging scenario is quite new, the present study is exploratory as well as descriptive in nature. The study being comprehensive one covers all the three sectors (public, private, and foreign) of Indian banking industry. To achieve the objectives of this study, we have resorted to sampling techniques and accordingly the data was collected through field survey using structured questionnaire (the questionnaire can be obtained from the authors on request) facilitating face-to-face interviews with bank officials and other persons connected with risk management operations. The genesis of the different questions incorporated in this questionnaire was to bring out and analyze the general framework and operational risk management framework adopted by the banks.

This study is based on a sample of 26 SCBs—18 PSBs, 8 PBs—and a foreign bank. This sample of 26 banks is made up of 19 small banks and 7 large banks (Exhibit 1). For the purpose of the analysis, foreign banks are included in the category of private sector banks.

| <b>Exhibit 1: List of Respondents (Banks)</b> |                                 |
|-----------------------------------------------|---------------------------------|
| <b>Size-Wise</b>                              | <b>Sector-Wise</b>              |
| <b>Large Banks</b>                            | <b>Public Sector Banks</b>      |
| <i>Public Sector Banks</i>                    | Allahabad Bank (AIB)            |
| Bank of Baroda (BOB)                          | Andhra Bank (AB)                |
| Canara Bank (CB)                              | Bank of Baroda (BOB)            |
| Punjab National Bank (PNB)                    | Canara Bank (CB)                |
| State Bank of India (SBI)                     | Central Bank of India (CBI)     |
| <i>Private Sector Banks</i>                   | Indian Bank (IB)                |
| HDFC Bank Ltd. (HDFC)                         | Oriental Bank of Commerce (OBC) |
| ICICI Bank Ltd. (ICICI)                       | Punjab National Bank (PNB)      |
| UTI Bank Ltd. (UTI) <sup>b</sup>              | Syndicate Bank (SyB)            |
|                                               | UCO Bank (UCOB)                 |

(Contd...)

**Exhibit 1: List of Respondents (Banks)***(...contd)*

| Size-Wise                         | Sector-Wise                       |
|-----------------------------------|-----------------------------------|
| <b>Small Banks</b>                | Union Bank of India (UBI)         |
| <i>Public Sector Banks</i>        | Vijaya Bank (VB)                  |
| Allahabad Bank (AIB)              | State Bank of Hyderabad (SBH)     |
| Andhra Bank (AB)                  | State Bank of India (SBI)         |
| Central Bank of India (CBI)       | State Bank of Indore (SBIn)       |
| Indian Bank (IB)                  | State Bank of Patiala (SBP)       |
| Oriental Bank of Commerce (OBC)   | State Bank of Saurashtra (SBS)    |
| Syndicate Bank (SyB)              | State Bank of Travancore (SBT)    |
| UCO Bank (UCOB)                   |                                   |
| Union Bank of India (UBI)         | <b>Private Sector Banks</b>       |
| Vijaya Bank (VB)                  | Bank of Rajasthan Ltd (BoR)       |
| State Bank of Hyderabad (SBH)     | Citibank N.A. (CITI) <sup>a</sup> |
| State Bank of Indore (SBIn)       | HDFC Bank Ltd. (HDFC)             |
| State Bank of Patiala (SBP)       | ICICI Bank Ltd. (ICICI)           |
| State Bank of Saurashtra (SBS)    | IndusInd Bank Ltd. (INDUS)        |
| State Bank of Travancore (SBT)    | Karnataka Bank Ltd. (KB)          |
| <i>Private Sector Banks</i>       | Kotak Mahindra Bank Ltd. (KMB)    |
| IndusInd Bank Ltd. (INDUS)        | UTI Bank Ltd. (UTI) <sup>b</sup>  |
| Bank of Rajasthan Ltd. (BoR)      |                                   |
| Kotak Mahindra Bank Ltd. (KMB)    |                                   |
| Karnataka Bank Ltd. (KB)          |                                   |
| Citibank N.A. (CITI) <sup>a</sup> |                                   |

**Note:** <sup>a</sup>Foreign bank; <sup>b</sup>Axis Bank is the new name for UTI bank.

In order to measure the importance assigned by the responding banks to the risk management aspects, the responses were obtained on a seven-point scale ranging from 1 to 7. Here, 1 means the lowest importance and 7 means the highest importance given to an item. For the purpose of analysis, mean score was computed. To examine the significance of difference about the importance given to various items between PSBs and PBs as well as small and large banks, the *t*-test was applied. The chi-square test was applied to examine whether the responses are independent of sector and size of the banks under study.

### General Framework of Risk Management

The first question raised to risk managers of commercial banks operating in India was aimed at knowing whether they had clearly defined their risk management framework or documented risk management policy. The banking sector-wise and size-wise responses obtained in this regard are presented in Table 1. Table 1 also indicates that most of the banks have well-defined risk management policies irrespective of their size and sector. Thus, the banks are aware of severe affects of risk and have a well-defined risk management framework in place.

| Table 1: Definition of Risk Management Guidelines         |          |                                    |                      |                                  |             |
|-----------------------------------------------------------|----------|------------------------------------|----------------------|----------------------------------|-------------|
| Response                                                  | Overall  | Sector-Wise Frequency Distribution |                      | Size-Wise Frequency Distribution |             |
|                                                           |          | Public Sector Banks                | Private Sector Banks | Large Banks                      | Small Banks |
| Yes                                                       | 26 (100) | 18 (100)                           | 8 (100)              | 7 (100)                          | 19 (100)    |
| No                                                        | –        | –                                  | –                    | –                                | –           |
| Total                                                     | 26       | 18                                 | 8                    | 7                                | 19          |
| Note: Figures in parentheses are the percentage of total. |          |                                    |                      |                                  |             |

The risk management policy of banks is aimed at serving several objectives such as survival, efficiency in operations, earning stability, uninterrupted operations, continued growth and preservation of reputation. During the field survey, the bankers were asked to disclose the level of importance they would assign to the various objectives of risk management policy. The responses were sought on a seven-point scale. Table 2(a) indicates the statistical summary of the responses so obtained sector-wise. It is obvious from Table 2(a) that ‘efficiency in operations’ and ‘uninterrupted operations’ (with a mean score

| Table 2(a): Sector-Wise Importance Assigned to Various Objectives of Risk Management Policy |            |         |                    |         |                       |         |            |
|---------------------------------------------------------------------------------------------|------------|---------|--------------------|---------|-----------------------|---------|------------|
| Objectives                                                                                  | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|                                                                                             | Public     | Private | Public             | Private |                       |         |            |
| Survival of Organization                                                                    | 5.22       | 5.43    | 1.26               | 1.51    | –0.21                 | –0.348  | 0.731      |
| Efficiency in Operations                                                                    | 5.28       | 5.38    | 1.02               | 0.52    | –9.72E-02             | –0.254  | 0.802      |
| Identifying and Achieving Acceptable Level of Worry                                         | 5.06       | 5.38    | 1.06               | 0.74    | –0.32                 | –0.771  | 0.448      |
| Earning Stability                                                                           | 5.17       | 5.57    | 0.92               | 0.79    | –0.40                 | –1.021  | 0.318      |
| Uninterrupted Operations                                                                    | 5.28       | 5.13    | 0.75               | 1.46    | 0.15                  | 0.356   | 0.725      |
| Continued Growth                                                                            | 5.06       | 5.75    | 1.11               | 0.46    | –0.69                 | –1.690  | 0.104      |
| Preservation of Reputation                                                                  | 5.22       | 6.00    | 1.06               | 0.00    | –0.78                 | –3.112  | 0.006      |

| Table 2(b): Size-Wise Importance Assigned to Various Objective of Risk Management Policy |            |       |                    |       |                       |         |            |
|------------------------------------------------------------------------------------------|------------|-------|--------------------|-------|-----------------------|---------|------------|
| Objectives                                                                               | Mean Score |       | Standard Deviation |       | Mean Score Difference | t-value | Sig. Level |
|                                                                                          | Large      | Small | Large              | Small |                       |         |            |
| Survival of Organization                                                                 | 5.86       | 5.06  | 0.38               | 1.47  | 0.80                  | 1.404   | 0.174      |
| Efficiency in Operations                                                                 | 5.43       | 5.26  | 0.79               | 0.93  | 0.17                  | 0.416   | 0.681      |
| Identifying and Achieving Acceptable Level of Worry                                      | 5.29       | 5.11  | 0.95               | 0.99  | 0.18                  | 0.415   | 0.682      |
| Earning Stability                                                                        | 5.29       | 5.28  | 0.95               | 0.89  | 7.94E-03              | 0.020   | 0.985      |
| Uninterrupted Operations                                                                 | 4.71       | 5.42  | 1.50               | 0.69  | –0.71                 | –1.203  | 0.268      |
| Continued Growth                                                                         | 5.43       | 5.21  | 0.53               | 1.13  | 0.22                  | 0.484   | 0.632      |
| Preservation of Reputation                                                               | 5.71       | 5.37  | 0.76               | 1.01  | 0.35                  | 0.820   | 0.420      |

of 5.28 each) are the most important objectives of risk management policy among the PSBs. 'Survival of organization' and 'preservation of reputation' both with the mean score of 5.22 each obtained the second position in terms of importance. Other objectives such as 'identifying and achieving acceptable level of worry' and 'continued growth' have obtained relatively lower mean score (5.06) and these are relatively the less important objectives of the risk management policy of PSBs.

Unlike the PSBs, 'preservation of reputation' (with a mean score of 6.00) is the most important objective of risk management policy among the PBs. Among these banks, 'continued growth', and 'earning stability' stood at 2<sup>nd</sup> and 3<sup>rd</sup> positions in terms of their relative importance. 'Uninterrupted operations' with the lowest mean indicates least important as an objective of risk management policy. The mean difference between the public and private sector banks is negative in case of each objective of risk management policy except one. It implies that, on an average, the private sector banks assign higher importance to various objectives of risk management policy than their counterpart, the public sector banks. However, the mean difference is found insignificant in case of each objective except one, i.e., 'preservation of reputation' which is found significant at 0.01 level. Thus, PBs are more worried about their reputation than the PSBs.

Table 2(b), which indicates the importance assigned to various objectives of risk management policy according to the size of banks, shows that 'survival of organization' (with a mean score of 5.86) is the most important objective of risk management policy of large size banks. 'Preservation of reputation', with a mean score of 5.71 and 'efficiency in operations', and 'continued growth', with a mean score of 5.43 each got the 2<sup>nd</sup> and 3<sup>rd</sup> place of importance among the large size banks. In contrast, in the case of small size banks 'uninterrupted operations' (with a mean score of 5.42) happens to be the most important objective, followed by 'preservation of reputation' (5.37) and 'earning stability' (5.28) as the 2<sup>nd</sup> and 3<sup>rd</sup> important objectives. Interestingly, the positive mean difference hints that the large size banks attach higher importance to various objectives of risk management policy as compared to small size banks. However, the *t*-test results indicate that the mean differences remain insignificant for each objective. Hence, there is no significant difference in the importance assigned to various objectives of risk management policy between the large and the small size banks.

The RBI guidelines as well as Basel II norms on risk management aspects of Indian banking industry clearly mentioned that the internally and externally designed audit committees should audit bank's risk management policy periodically. Accordingly, a question was included in the survey to know how frequently the banks would get their risk management policy audited. The results indicated that the risk management policy was audited annually in 88.9% of the PSBs and 50% of the PBs (Table 3). While one-fourth of the PBs go for audit of their risk management policy occasionally, 12.5% do the same half-yearly and 12.5% on biennial intervals.

| Table 3: Frequency of Auditing Bank's Risk Management Policy     |           |                                    |                      |                  |                                  |             |                  |
|------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Audity Frequency                                                 | Overall   | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                  |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Annually                                                         | 20 (76.9) | 16 (88.9)                          | 4 (50)               | 5.501            | 6 (85.7)                         | 14 (73.7)   | 1.264            |
| Two-Yearly                                                       | 1 (3.8)   | –                                  | 1 (12.5)             |                  | –                                | 1 (5.3)     |                  |
| Occasionally                                                     | 3 (11.5)  | 1 (5.6)                            | 2 (25)               |                  | 1 (14.3)                         | 2 (10.5)    |                  |
| Half-Yearly                                                      | 2 (7.7)   | 1 (5.6)                            | 1 (12.5)             |                  | –                                | 2 (10.5)    |                  |
| <b>Total</b>                                                     | <b>26</b> | <b>18</b>                          | <b>8</b>             |                  | <b>7</b>                         | <b>19</b>   |                  |
| <b>Note:</b> Figures in parentheses are the percentage of total. |           |                                    |                      |                  |                                  |             |                  |

The size-wise analysis reveals that in the case of both small and large size banks a majority of the banks have annual periodicity for auditing their risk management policy. It is noteworthy that only one large bank out of seven reviews its risk management policy occasionally and the rest of six banks do the same on annual basis. However, the half-yearly and occasional review is done by four banks (approximately 21%) among the small banks. Hence, the choice of interval for audit of risk management policy is dependent on sector and the size to which the bank belongs to.

Further, we obtained the bankers' views about the originator of risk management framework, i.e., New Basel Capital Accord. The bankers were asked whether they could perceive that the Basel Accord would help them deal with risk effectively. Table 4 presents the bankers' response in this regard. Interestingly, it can be observed from Table 4 that every banker irrespective of their size and sector responded in favor of New Basel Capital Accord and thus it can be interpreted that they believe the accord would be helpful in dealing with risk effectively.

| Table 4: Responses Received for the Statement–<br>“Basel Accord Helps in Dealing with Risk Effectively” |           |                                    |                      |                                  |             |
|---------------------------------------------------------------------------------------------------------|-----------|------------------------------------|----------------------|----------------------------------|-------------|
| Response                                                                                                | Overall   | Sector-Wise Frequency Distribution |                      | Size-Wise Frequency Distribution |             |
|                                                                                                         |           | Public Sector Banks                | Private Sector Banks | Large Banks                      | Small Banks |
| Yes                                                                                                     | 26 (100)  | 18 (100)                           | 8 (100)              | 7 (100)                          | 19 (100)    |
| No                                                                                                      | –         | –                                  | –                    | –                                | –           |
| <b>Total</b>                                                                                            | <b>26</b> | <b>18</b>                          | <b>8</b>             | <b>7</b>                         | <b>19</b>   |
| <b>Note:</b> Figures in parentheses are the percentage of total.                                        |           |                                    |                      |                                  |             |

For the success of risk management policy, the RBI has directed banks to prepare their accounting books in consonance with the US GAAP. The basic reason behind this is the increasing global operations of banks. The bankers' responses were obtained to know whether they had started preparing their accounting books as per the US GAAP. Table 5, which presents the responses for this query, indicates that, at the overall level, as many as 22 banks out of 26 have responded positively. Three banks, comprising two

| Table 5: Preparation of Accounting Books as per US GAAP   |           |                                    |                      |                  |                                  |             |                  |
|-----------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Response                                                  | Overall   | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                           |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Yes                                                       | 22 (84.5) | 16 (88.9)                          | 6 (75)               | 0.369            | 5 (71.4)                         | 17 (89.5)   | 0.290            |
| No                                                        | 1 (3.8)   | 1 (5.6)                            | –                    |                  | –                                | 1 (5.3)     |                  |
| No Response                                               | 3 (11.5)  | 1 (5.6)                            | 2 (25)               |                  | 2 (28.6)                         | 1 (5.3)     |                  |
| Total                                                     | 26        | 18                                 | 8                    |                  | 7                                | 19          |                  |
| Note: Figures in parentheses are the percentage of total. |           |                                    |                      |                  |                                  |             |                  |

private and one public sector, have not given any response. Size-wise analysis brought out that five large banks (71.4%) out of seven have started maintaining their books of accounts as per the US GAAP. However, two large banks did not responded to this query. In contrast, as high as 89.5% of the small size banks responded positively towards the US GAAP. From the above analysis, one can conclude that a majority of commercial banks in India are following international accounting standards. This can be attributed to the RBI's initiative and efforts for the same.

After taking a general view of the risk management practices of the banks, the next question raised is about the committees that the banks have set up for the successful implementation of the RBI's risk management guidelines. The bankers' responses in this regard is presented in Table 6 which clearly indicates that Assets Liability Committee (ALCO) and Investment Committees are set up by as many as 94.4% of the PSBs. Risk Management Committee and Operational Risk Management Committee (ORMC) have been set up by 88.9 and 83.3% of the PSBs. On the other hand, 77.8% of the PSBs have established Credit Policy Committee, Credit Risk Management Committee, ALCO/Operational Risk Management Support Group and Independent Loan Review Group. Mid office and System & Procedure Committees have been set up by 13 (72.2%) and 12 banks (66.7%) respectively. On the other side, all private sector banks have set up risk management committees. The ALCO and investment committees are set up by six (75%) private banks. Five PBs (62.5%) have set up ALCO/Operational Risk Support Group and ORMC. Credit Policy Committee, Credit Risk Management Committee and Mid Office are set up by four (50%) PBs. Only 25% of the PBs have set up System & Procedure Committees and Independent Loan Review Group.

Table 6 further brings out that Risk Management Committee, Credit Policy Committee and Assets Liability Committee have been set up by 85.7% of the large size banks. Each of the large size banks has set up an Investment Committee. Five large banks (71.4%) have set up Credit Risk Management Committee, Operational Risk Management Committee, and Mid Office. System & Procedure Committee, ALCO/Operational Risk Management Support Group and Independent loan review group are set up by four large banks out of eight.

| Table 6: Committees for Managing and Measuring Risk                                              |           |                                    |                      |                  |                                  |             |                  |
|--------------------------------------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Name of the Committee for Risk Management                                                        | Overall   | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                                                  |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Number                                                                                           |           | 18                                 | 8                    |                  | 7                                | 19          |                  |
| Risk Management Committees                                                                       | 24 (92.3) | 16 (88.9)                          | 8 (100)              | 0.963            | 6 (85.7)                         | 18 (94.7)   | 0.586            |
| Credit Policy Committee                                                                          | 18 (69.2) | 14 (77.8)                          | 4 (50)               | 2.006            | 6 (85.7)                         | 12 (63.2)   | 1.222            |
| Assets Liability Committee                                                                       | 23 (88.5) | 17 (94.4)                          | 6 (75)               | 2.052            | 6 (85.7)                         | 17 (89.5)   | 0.071            |
| Investment Committee                                                                             | 23 (88.5) | 17 (94.4)                          | 6 (75)               | 2.052            | 7 (100)                          | 16 (84.2)   | 1.249            |
| System & Procedure Committee                                                                     | 14 (53.8) | 12 (66.7)                          | 2 (25)               | 3.869**          | 4 (57.1)                         | 10 (52.6)   | 0.042            |
| Credit Risk Management Committee                                                                 | 18 (69.2) | 14 (77.8)                          | 4 (50)               | 2.006            | 5 (71.4)                         | 13 (68.4)   | 0.022            |
| ALCO/Operational Risk Management Support Group                                                   | 19 (73.1) | 14 (77.8)                          | 5 (62.5)             | 0.657            | 4 (57.1)                         | 15 (78.9)   | 1.236            |
| Operational Risk Management Committee                                                            | 20 (86.9) | 15 (83.3)                          | 5 (62.5)             | 1.354            | 5 (71.4)                         | 15 (78.9)   | 0.163            |
| Independent Loan Review Group                                                                    | 16 (61.5) | 14 (77.8)                          | 2 (25)               | 6.518**          | 4 (57.1)                         | 12 (63.2)   | 0.078            |
| Mid Office                                                                                       | 17 (65.4) | 13 (72.2)                          | 4 (50)               | 1.208            | 5 (71.4)                         | 12 (63.2)   | 0.155            |
| <b>Total</b>                                                                                     | <b>26</b> | <b>18</b>                          | <b>8</b>             |                  | <b>7</b>                         | <b>19</b>   |                  |
| <b>Note:</b> Figures in parentheses are the percentage of total.<br>**Significant at 0.05 level. |           |                                    |                      |                  |                                  |             |                  |

Table 6 also reveals that in the case of small size banks, Risk Management Committees are set up by as many as 18 banks (94.7%). ALCO and Investment committees are set up by 89.5% and 84.2% of the small banks respectively. Fifteen banks (78.9%) have set up ALCO/Operational Risk Management Support Group and ORMC. Credit Risk Management Committee exists in 68.4% of the small size banks. Thus, ALCO, Investment Committees and Risk Management Committees are the committees established by around 90% of the banks, which is true irrespective of size and sector.

After getting oriented towards risk management committees, we asked the bankers about the relative importance they would assign to the various risks being faced by them. Table 7(a), which presents the responses obtained according to sector, shows that the credit risk obtains the highest mean score (5.56) and thus it is the most important risk in terms of the risk management policy of PSBs. Market risk (mean score 5.44) followed the credit risk in terms of importance. Same is the case with the private sector banks wherein credit risk gets the highest mean score (5.88), followed by market risk and operational risk with the mean score of 5.50 each. Country risk has been assigned the lowest importance in the risk management policy of both the public and the private sector

| Table 7(a): Sector-Wise Importance Assigned to Various Risks in Risk Management Policy by Banks |            |         |                    |         |                       |         |            |
|-------------------------------------------------------------------------------------------------|------------|---------|--------------------|---------|-----------------------|---------|------------|
| Risk                                                                                            | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|                                                                                                 | Public     | Private | Public             | Private |                       |         |            |
| Credit Risk                                                                                     | 5.56       | 5.88    | 1.25               | 0.35    | -0.32                 | -0.705  | 0.488      |
| Market Risk                                                                                     | 5.44       | 5.50    | 1.04               | 0.76    | -5.56E-02             | -0.135  | 0.894      |
| Operational Risk                                                                                | 4.89       | 5.50    | 1.32               | 0.53    | -0.61                 | -1.250  | 0.223      |
| Strategic and Business Environment Risk                                                         | 4.72       | 4.50    | 1.02               | 1.69    | 0.22                  | 0.418   | 0.680      |
| Country Risk                                                                                    | 4.56       | 4.00    | 1.34               | 1.73    | 0.56                  | 0.859   | 0.399      |

  

| Table 7(b): Size-Wise Importance Assigned to Various Risks in Risk Management Policy by Banks |            |       |                    |       |                       |         |            |
|-----------------------------------------------------------------------------------------------|------------|-------|--------------------|-------|-----------------------|---------|------------|
| Risk                                                                                          | Mean Score |       | Standard Deviation |       | Mean Score Difference | t-value | Sig. Level |
|                                                                                               | Large      | Small | Large              | Small |                       |         |            |
| Credit Risk                                                                                   | 5.29       | 5.79  | 1.89               | 0.54  | -0.50                 | -0.695  | 0.512      |
| Market Risk                                                                                   | 5.43       | 5.47  | 1.51               | 0.70  | -4.51E-02             | -0.105  | 0.917      |
| Operational Risk                                                                              | 5.43       | 4.95  | 1.51               | 1.03  | 0.48                  | 0.933   | 0.360      |
| Strategic and Business Environment Risk                                                       | 4.71       | 4.63  | 1.60               | 1.12  | 8.27E-02              | 0.149   | 0.883      |
| Country Risk                                                                                  | 4.83       | 4.26  | 1.60               | 1.41  | 0.57                  | 0.838   | 0.410      |

banks. The sector-wise comparison of the scores obtained by various types of risks indicates that credit risk, market risk, and operational risks have relatively achieved greater importance in risk management policy of PBs than that of the PSBs.

However, the same is found insignificant when examined by applying *t*-test at 5% level of significance. Hence, the importance attached to various types of risk does not differ between PSBs and PBs. Table 7(b) presents size-wise mean scores obtained against various types of risks encountered by commercial banks in India. Table 7 clearly indicates that, in the case of large-size banks, market risk and operational risk have got the highest mean score (5.43), followed by credit risk (mean 5.29) in the case of large size banks. In contrast, credit risk has received the highest importance (means score being 5.79) in the risk management policy of small size banks. Market risk and operational risk have gained 2<sup>nd</sup> and 3<sup>rd</sup> place in terms of importance. 'Strategic and business environment risk' stood at the 4<sup>th</sup> position with a mean score of 4.63 among the small banks and at the 5<sup>th</sup> place among the large banks. Thus, credit risk and market risk have relatively higher score in the management policy of small size banks in comparison to the larger ones, but this difference turns insignificant on the examination through *t*-test.

### Operational Risk Management

The first question raised to the bankers regarding operational risk was about the major causes of operational loss in their banks. It is essential to state that the various sources of operational risk include people, process, systems, and external factors. The responses obtained are presented in Table 8(a) and (b).

| Table 8(a): Sector-Wise Importance Assigned to Causes of Operational Loss in Bank |            |         |                    |         |                       |         |            |
|-----------------------------------------------------------------------------------|------------|---------|--------------------|---------|-----------------------|---------|------------|
| Source of Operational Risk                                                        | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|                                                                                   | Public     | Private | Public             | Private |                       |         |            |
| People                                                                            | 2.14       | 2.17    | 0.53               | 0.41    | -2.38E-02             | -0.097  | 0.924      |
| Processes                                                                         | 2.00       | 2.00    | 0.55               | 0.00    | 0.00                  | 0.000   | 1.000      |
| Systems                                                                           | 1.86       | 1.80    | 0.53               | 0.45    | 5.71E-022             | 0.213   | 0.834      |
| External Factors                                                                  | 2.14       | 2.00    | 0.36               | 0.00    | 0.14                  | 0.863   | 0.400      |
| Table 8(b): Size-Wise Importance Assigned to Causes of Operational Loss in Bank   |            |         |                    |         |                       |         |            |
| Source of Operational Risk                                                        | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|                                                                                   | Large      | Small   | Large              | Small   |                       |         |            |
| People                                                                            | 2.14       | 2.15    | 0.38               | 0.55    | -1.10E-02             | -0.047  | 0.963      |
| Processes                                                                         | 2.17       | 2.00    | 0.00               | 0.58    | 0.17                  | 0.000   | 1.000      |
| Systems                                                                           | 2.10       | 1.69    | 0.41               | 0.48    | 0.40                  | 2.088   | 0.052      |
| External Factors                                                                  | 2.00       | 2.15    | 0.00               | 0.38    | -0.15                 | -0.988  | 0.337      |

Table 8(a) indicates that people and external factors are the causes of operational loss in PSBs. In the case of PBs, people with a mean score of 2.17 are the major cause of operational risk. Processes and external factors with the mean score of 2.00 obtained the 2<sup>nd</sup> position. Systems obtained the lowest mean score both in PSBs and PBs, hence it is the least important cause of operational risk. The *t*-test indicates no difference in the importance of various factors causing operational risk when analyzed across the size and sector of the banks. People and process are considered the more important factors than others in banks irrespective of their size. After studying the major sources of operational loss in banks, the next question arises: Who is responsible for operational risk management in banks? The responses obtained in this regard are presented in Table 9. Table 9 also indicates that

| Table 9: Responsibility of Operational Risk Management in Banks                                    |           |                                    |                      |                  |                                  |             |                  |
|----------------------------------------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Risk Management Authority                                                                          | Overall   | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                                                    |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Board of Directors                                                                                 | 14 (53.8) | 11 (61.1)                          | 3 (37.5)             | 1.633            | 5 (71.4)                         | 9 (47.4)    | 0.010            |
| Risk Management Committee of the Board                                                             | 8 (30.8)  | 6 (33.3)                           | 2 (25)               | 0.159            | 3 (42.9)                         | 5 (26.3)    | 0.037            |
| Operational Risk Management Committee/ Department                                                  | 12 (46.2) | 8 (44.4)                           | 4 (50)               | 0.159            | 5 (71.4)                         | 7 (36.8)    | 0.586            |
| Operational Risk Manager                                                                           | 8 (30.8)  | 6 (33.3)                           | 2 (25)               | 0.159            | 2 (28.6)                         | 6 (31.6)    | 0.586            |
| Support Group                                                                                      | 5 (19.2)  | 5 (27.8)                           | –                    | 2.857***         | 2 (28.6)                         | 3 (15.8)    | 0.073            |
| No Response                                                                                        | 6 (23.1)  | 4 (22.2)                           | 2 (25)               |                  | –                                | 6 (31.6)    |                  |
| <b>Total</b>                                                                                       | <b>26</b> | <b>18</b>                          | <b>8</b>             |                  | <b>7</b>                         | <b>19</b>   |                  |
| <b>Note:</b> Figures in parentheses are the percentage of total.<br>*** Significant at 0.10 level. |           |                                    |                      |                  |                                  |             |                  |

'board of directors' is responsible for operational risk management in the 14 (53.8%) banks in India. Operational Risk Management Committee and Risk Management Committee of the Board are responsible in case of 46.2% and 30.8% of the banks in India.

The sector-wise analysis reveals that 61.1% of PSBs and 37.5% of PBs have assigned this responsibility to the board of directors. The same task is performed by the Risk Management Committee of the board in 33.3% of the PSBs and 25% of PBs. Operational risk manager is responsible for the operational risk management in 33.3% of PSBs and 25% of PBs. The size-wise frequency distribution shows that Board is responsible for operational risk management in 71.4% of large banks and 47.4% of small banks. In 42.9% of large banks and 26.3% of small banks, the risk management committee of the board is responsible for operational risk management. Operational Risk Management Committee/ Department performs this task in five (71.4%) large banks and seven (36.8%) small banks. Operational risk manager is responsible in only two (28.6%) large and six (31.6%) small banks. Thus, size of the bank and sector of the bank seem to have no effect on the choice of authority for managing the operational risk. The bankers were next asked to assign importance to various aspects, which would help them in recognizing risk events in their bank. These factors generally include experience, judgement, intuition, linked events, regulatory requirements, etc. The respondents were asked to disclose the level of importance attached to these factors on a seven-point scale ranging from 'very low importance' to 'very high importance'. The responses obtained in this regard are presented in a condensed form in Tables 10(a) and 10(b). Table 10(a) indicates that 'experience' and 'regulatory requirements' (with the mean scores of 5.50 and 5.21) are the most and 2<sup>nd</sup>

**Table 10(a): Sector-Wise Importance Assigned to Factors for Recognizing Risk Events**

| Factors                 | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|-------------------------|------------|---------|--------------------|---------|-----------------------|---------|------------|
|                         | Public     | Private | Public             | Private |                       |         |            |
| Experience              | 5.50       | 5.83    | 0.52               | 0.41    | -0.33                 | -1.537  | 0.150      |
| Judgment                | 5.07       | 5.17    | 0.73               | 1.17    | -9.52E-02             | -0.223  | 0.826      |
| Intuition               | 4.00       | 3.83    | 1.11               | 1.72    | 0.17                  | 0.218   | 0.833      |
| Linked Events           | 4.86       | 5.17    | 0.77               | 0.75    | -0.31                 | -0.829  | 0.418      |
| Regulatory Requirements | 5.21       | 5.50    | 0.97               | 0.84    | -0.29                 | -0.624  | 0.541      |

**Table 10(b): Size-Wise Importance Assigned to Factors for Recognizing Risk Events**

| Factors                 | Mean Score |       | Standard Deviation |       | Mean Score Difference | t-value | Sig. Level |
|-------------------------|------------|-------|--------------------|-------|-----------------------|---------|------------|
|                         | Large      | Small | Large              | Small |                       |         |            |
| Experience              | 5.71       | 5.54  | 0.49               | 0.52  | 0.18                  | 0.737   | 0.471      |
| Judgment                | 5.43       | 4.92  | 0.79               | 0.86  | 0.51                  | 1.287   | 0.214      |
| Intuition               | 3.43       | 4.23  | 1.62               | 1.01  | -0.80                 | -1.371  | 0.187      |
| Linked Events           | 4.57       | 5.15  | 0.79               | 0.69  | -0.58                 | -1.719  | 0.103      |
| Regulatory Requirements | 5.14       | 5.38  | 0.90               | 0.96  | -0.24                 | -0.548  | 0.590      |

most important aspects for recognizing the risk events in PSBs. 'Judgment' (with a mean score of 5.07) and 'linked events' (mean score 4.86) obtain 3<sup>rd</sup> and 4<sup>th</sup> places in terms of their importance.

In the case of private sector banks, 'experience' with a mean score of 5.83 and 'regulatory requirements' with a mean score of 5.50 are the most important and second most important aspects considered for recognizing risk events. 'Judgment' and 'linked events' (with a mean of 5.17) stood at the 3<sup>rd</sup> position. 'Intuition' with a mean score of 4.00 in PSBs and 3.83 in PBs is the least important aspect considered for risk events recognition. The above practice also holds true, when analyzed across the size of the bank. Interestingly, the importance assigned to various factors is independent of size as well as sector of the bank. The next question was related to the responsibility of presentation of Operational Risk Monitoring Report, i.e., who is responsible for presenting such reports. The responses obtained (Table 11) indicate that 'operational risk management unit' and 'internal audit' have the responsibility of presenting operational risk monitoring report in case of 65.4% and 34.6% of the banks under study respectively. As found earlier, the phenomenon of assigning the responsibility holds true irrespective of ownership pattern and the size of the banks.

| Table 11: Responsibility of Presenting Operational Risk Monitoring Report |           |                                    |                      |                  |                                  |             |                  |
|---------------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Risk Management Authority                                                 | Overall   | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                           |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Business Unit                                                             | 1 (3.8)   | 1 (5.6)                            | –                    | 0.451            | –                                | 1 (5.3)     | 0.567            |
| Group Function                                                            | 1 (3.8)   | –                                  | 1 (12.5)             | 2.456            | 1 (14.3)                         | –           | 1.955            |
| Operational Risk Management Unit                                          | 17 (65.4) | 12 (66.7)                          | 5 (62.5)             | 0.019            | 5 (71.4)                         | 12 (63.2)   | 1.556            |
| Internal Audit                                                            | 9 (34.6)  | 5 (27.8)                           | 4 (50)               | 1.626            | 4 (57.1)                         | 5 (26.3)    | 0.642            |
| No Response                                                               | 6 (23.1)  | 4 (22.2)                           | 2 (25)               |                  | –                                | 6 (31.6)    |                  |
| <b>Total</b>                                                              | <b>26</b> | <b>18</b>                          | <b>8</b>             |                  | <b>7</b>                         | <b>19</b>   |                  |
| Note: Figures in parentheses are the percentage of total.                 |           |                                    |                      |                  |                                  |             |                  |

After knowing the authority concerned for the presentation of operational risk monitoring report, the next question for which the study wants to find answer is, what importance is given to the various constituents of operational risk report in the banks. Therefore, the bankers were asked to give the relative importance to various constituents of operational risk report in their bank. The responses obtained in this regard are presented in Tables 12(a) and 12(b). Table 12(a) indicates that 'operational information' is considered to be the most important constituent of the report among the PSBs as well as PBs. 'Internal financial data' with a mean score of 3.43 (PSBs) and 3.50 (PBs) stood second as a constituents of operational risk monitoring report. 'External market information' (with a mean score of 2.29 in the PSBs and 2.67 in the PBs) has the least

| Table 12(a): Sector-Wise Importance Assigned to Constituents of Operational Risk Report |            |         |                    |         |                       |         |            |
|-----------------------------------------------------------------------------------------|------------|---------|--------------------|---------|-----------------------|---------|------------|
| Constituents                                                                            | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|                                                                                         | Public     | Private | Public             | Private |                       |         |            |
| Internal Financial Data                                                                 | 3.43       | 3.50    | 0.65               | 0.55    | -7.14E-02             | -0.236  | 0.816      |
| Operational Information                                                                 | 3.50       | 3.67    | 0.65               | 0.52    | -0.17                 | -0.554  | 0.586      |
| Compliance Data                                                                         | 3.29       | 3.17    | 0.73               | 0.75    | 0.12                  | 0.333   | 0.743      |
| External Market Information                                                             | 2.29       | 2.67    | 0.91               | 1.21    | -0.38                 | -0.777  | 0.447      |
| Table 12(b): Size-Wise Importance Assigned to Constituents of Operational Risk Report   |            |         |                    |         |                       |         |            |
| Constituents                                                                            | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|                                                                                         | Large      | Small   | Large              | Small   |                       |         |            |
| Internal Financial Data                                                                 | 3.43       | 3.46    | 0.53               | 0.66    | -3.30E-02             | -0.113  | 0.911      |
| Operational Information                                                                 | 3.43       | 3.62    | 0.79               | 0.51    | -0.19                 | -0.649  | 0.525      |
| Compliance Data                                                                         | 3.14       | 3.31    | 0.69               | 0.75    | -0.16                 | -0.481  | 0.636      |
| External Market Information                                                             | 2.43       | 2.38    | 1.13               | 0.96    | 4.40E-02              | 0.092   | 0.928      |

importance in the operational risk report. Size-wise analysis also indicates more or less a similar phenomenon as obtained in the case of sector-wise analysis. In other words, size has no influence on the importance of various constituents.

The next question is: Whether the banks have designed the operational risk management framework as per the New Basel Accord? The responses obtained (Table 13) have indicated that more than half of the banks have responded positively to the above-mentioned question. Around one-fourth of the banks have not given any response in this regard. Non-response may imply lack of confidence among the banks in accepting that they are not having the operational risk management framework as per the Basel accord. So this is a serious issue, which requires further investigation by the researchers.

| Table 13: Design of Operational Risk Framework as Per New Basel Capital Accord |           |                                    |                      |                  |                                  |             |                  |
|--------------------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Response                                                                       | Total     | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                                |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Yes                                                                            | 15 (57.7) | 10 (55.6)                          | 5 (62.5)             | 0.317            | 6 (85.7)                         | 9 (47.4)    | 0.659            |
| No                                                                             | 5 (19.2)  | 4 (22.2)                           | 1 (12.5)             |                  | 1 (14.3)                         | 4 (21.1)    |                  |
| No Response                                                                    | 6 (23.1)  | 4 (22.2)                           | 2 (25)               |                  | –                                | 6 (31.6)    |                  |
| Total                                                                          | 26        | 18                                 | 8                    |                  | 7                                | 19          |                  |
| Note: Figures in parentheses are the percentage of total.                      |           |                                    |                      |                  |                                  |             |                  |

After taking a general view of the operational risk management framework, the next question raised is about the business lines that the banks have designed on account of Basel II. The responses obtained in this regard are presented in Table 14, which clearly indicates that ‘commercial banking’, and ‘payment and settlement’ business lines are set up by as many as 61.1% of PSBs. ‘Trading and sales’ and ‘retail banking’ have been set up in 55.6% of the PSBs. On the other hand, ‘corporate finance’ and ‘agency services’ have been set up by eight (44.4%) and seven (38.9%) banks respectively. Only three PSBs have set up ‘assets management’ business unit. On the other side, 75% of PBs have set up ‘corporate finance’, ‘trading and sales’, and ‘retail banking’ units. Commercial banking and payment and settlement are set up by 5 (62.5%) PBs.

| Table 14: Design of Business Lines                               |           |                                    |                      |                  |                                  |             |                  |
|------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Business Lines                                                   | Total     | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                  |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Corporate Finance                                                | 14 (53.8) | 8 (44.4)                           | 6 (75)               | 1.987            | 6 (85.7)                         | 8 (42.1)    | 1.987            |
| Trading and Sales                                                | 16 (61.5) | 10 (55.6)                          | 6 (75)               | 0.580            | 5 (71.4)                         | 11 (57.9)   | 1.948            |
| Retail Banking                                                   | 16 (61.5) | 10 (55.6)                          | 6 (75)               | 0.580            | 5 (71.4)                         | 11 (57.9)   | 1.948            |
| Commercial Banking                                               | 16 (61.5) | 11 (61.1)                          | 5 (62.5)             | 1.948            | 6 (85.7)                         | 10 (52.6)   | 0.580            |
| Payment and Settlement                                           | 16 (61.5) | 11 (61.1)                          | 5 (62.5)             | 1.948            | 6 (85.7)                         | 10 (52.6)   | 0.580            |
| Agency Services                                                  | 11 (42.3) | 7 (38.9)                           | 4 (50)               | 0.016            | 4 (57.1)                         | 7 (36.8)    | 0.016            |
| Assets Management                                                | 6 (23.1)  | 3 (16.7)                           | 3 (37.5)             | 0.878            | 2 (28.6)                         | 4 (21.1)    | 0.016            |
| Retail Brokerage                                                 | 5 (19.2)  | 2 (11.1)                           | 3 (37.5)             | 1.893            | 2 (28.6)                         | 3 (15.8)    | 0.069            |
| No Response                                                      | 9 (34.6)  | 7 (38.9)                           | 2 (25)               |                  | 1 (14.3)                         | 8 (42.1)    |                  |
| <b>Total</b>                                                     | <b>26</b> | <b>18</b>                          | <b>8</b>             |                  | <b>7</b>                         | <b>19</b>   |                  |
| <b>Note:</b> Figures in parentheses are the percentage of total. |           |                                    |                      |                  |                                  |             |                  |

It can also be observed from Table 14 that ‘corporate finance’, ‘commercial banking’, ‘payment and settlement’ have been set up by 85.7% of the large size banks. Five (71.4%) large banks have set up ‘trading and sales’, and ‘retail banking’ business lines. ‘Agency services’ have been set up by four large banks. In the case of small size banks, ‘trading and sales’ and ‘retail banking business’ lines are set up by 11 (57.9%) banks and ‘commercial banking’ and ‘payment and settlement’ business lines by ten (52.6%) banks.

As per Basel and RBI guidelines, the bankers should maintain disaster recovery and business continuity plans for addressing internal and external interruptions. On account of this, we made an attempt to find the reality in this regard. Table 15 presents the responses obtained from the banks about these plans. It is clear from Table 15 that a majority of the banks, irrespective of their size and sector, have established both—disaster recovery plans and business continuity plan—to address the external and internal interruptions.

| Table 15: Plans for Addressing Internal and External Interruptions |           |                                    |                      |                  |                                  |             |                  |
|--------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Plans                                                              | Total     | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                    |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Disaster Recovery Plans                                            | –         | –                                  | –                    | 0.952            | –                                | –           | 0.220            |
| Business Continuity Plans                                          | 2 (7.7)   | 2 (11.1)                           | –                    |                  | 1 (14.3)                         | 1 (5.3)     |                  |
| Both                                                               | 18 (69.2) | 12 (66.7)                          | 6 (75)               |                  | 6 (85.7)                         | 12 (63.2)   |                  |
| No Response                                                        | 6 (23.1)  | 4 (22.2)                           | 2 (25)               |                  | –                                | 6 (31.6)    |                  |
| Total                                                              | 26        | 18                                 | 8                    |                  | 7                                | 19          |                  |
| Note: Figures in parentheses are the percentage of total.          |           |                                    |                      |                  |                                  |             |                  |

During this study, the bankers were also asked about the tools used by them for assessing operational risk in their bank. The RBI has suggested the use of ‘score cards’, ‘risk mapping’, ‘risk matrix’ and ‘scenario analysis’ for the assessment of operational risk. The responses obtained regarding this question were presented in Table 16.

| Table 16: Tools for Assessing Operational Risk                                           |           |                                    |                      |                  |                                  |             |                  |
|------------------------------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Tools                                                                                    | Total     | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                                          |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Score Card—Self Risk Assessment                                                          | 15 (57.7) | 11 (61.1)                          | 4 (50)               | 0.796            | 5 (71.4)                         | 10 (52.6)   | 0.101            |
| Risk Mapping                                                                             | 5 (19.2)  | 2 (11.1)                           | 3 (37.5)             | 2.537            | 3 (42.9)                         | 2 (10.5)    | 2.537            |
| Statistics or Risk Matrix—Risk Indicators                                                | 10 (38.5) | 5 (27.8)                           | 5 (62.5)             | 3.316***         | 5 (71.4)                         | 5 (26.3)    | 3.316***         |
| Scenario Analysis                                                                        | 6 (23.1)  | 3 (16.7)                           | 3 (37.5)             | 1.377            | 3 (42.9)                         | 3 (15.8)    | 1.377            |
| No Response                                                                              | 7 (26.9)  | 5 (27.8)                           | 2 (25)               |                  | 1 (14.3)                         | 6 (31.6)    |                  |
| <b>Total</b>                                                                             | <b>26</b> | <b>18</b>                          | <b>8</b>             |                  | <b>7</b>                         | <b>19</b>   |                  |
| Note: Figures in parentheses are the percentage of total; *** significant at 0.10 level. |           |                                    |                      |                  |                                  |             |                  |

Table 16 also shows that at the overall level, ‘score cards’ are used by 57.7% of banks in India followed by ‘risk matrix’. The banks have used more than one tool for operational risk assessment. ‘Scenario analysis’ tool of assessment is used by 23.1% of banks. ‘Risk mapping’ exercise as a tool of operational risk assessment is used by two PSBs and three PBs. The same holds true on size-wise analysis, wherein three large banks (42.9%) and two small banks (10.5%) used this tool for assessment for operational risk.

Next, a question is raised to investigate the frequency for making review of the tools considered for assessing operational risk. The responses obtained in this regard are presented in Table 17 which clearly indicates that the highest percentage of the banks

reviewed the tools for operational risk assessment on an annual basis (30.8%), followed by 19.2% doing the same on quarterly basis. This phenomenon holds good irrespective of ownership pattern. However, the proportion of small banks making quarterly review is higher than that of large size banks.

| Table 17: Review of Operational Risk Assessment Tools     |           |                                    |                      |                  |                                  |             |                  |
|-----------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Frequency of Review                                       | Total     | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                           |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Monthly                                                   | 3 (11.5)  | 2 (11.1)                           | 1 (12.5)             | 0.333            | 2 (28.6)                         | 1 (5.3)     | 3.534            |
| Quarterly                                                 | 5 (19.2)  | 3 (16.7)                           | 2 (25)               |                  | 1 (14.3)                         | 4 (21.1)    |                  |
| Bi-annually                                               | 3 (11.5)  | 2 (11.1)                           | 1 (12.5)             |                  | –                                | 3 (15.8)    |                  |
| Annually                                                  | 8 (30.8)  | 6 (33.3)                           | 2 (25)               |                  | 3 (42.9)                         | 5 (26.3)    |                  |
| No Response                                               | 7 (26.9)  | 5 (27.8)                           | 2 (25)               |                  | 1 (14.3)                         | 6 (31.6)    |                  |
| <b>Total</b>                                              | <b>26</b> | <b>18</b>                          | <b>8</b>             |                  | <b>7</b>                         | <b>19</b>   |                  |
| Note: Figures in parentheses are the percentage of total. |           |                                    |                      |                  |                                  |             |                  |

The bankers were further asked to rank the factors which would cause legal risk in their banks. The responses obtained in this regard are presented in Tables 18(a) and 18(b). Table 18(a) clearly indicates that ‘court opinions and regulations’ (mean score, 2.77) followed by ‘new statute’ (mean score, 2.64) is the most important cause of legal risk in PSBs.

| Table 18(a): Sector-Wise Ranking of Factors Causing Legal Risk |            |         |                    |         |                       |         |            |
|----------------------------------------------------------------|------------|---------|--------------------|---------|-----------------------|---------|------------|
| Aspects                                                        | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|                                                                | Public     | Private | Public             | Private |                       |         |            |
| New Statute                                                    | 2.64       | 1.75    | 1.29               | 1.50    | 0.89                  | 1.134   | 0.277      |
| Tax Legislations                                               | 2.45       | 2.75    | 1.13               | 0.96    | –0.30                 | –0.464  | 0.650      |
| Court Opinions and Regulations                                 | 2.77       | 3.25    | 1.09               | 0.96    | –0.48                 | –0.788  | 0.443      |
| Activities of Institutions Management and Employees            | 2.50       | 3.00    | 1.09               | 0.82    | –0.50                 | –0.837  | 0.417      |
| Table 18(b): Size-Wise Ranking of Factors Causing Legal Risk   |            |         |                    |         |                       |         |            |
| Aspects                                                        | Mean Score |         | Standard Deviation |         | Mean Score Difference | t-value | Sig. Level |
|                                                                | Large      | Small   | Large              | Small   |                       |         |            |
| New Statute                                                    | 1.60       | 2.80    | 1.34               | 1.23    | –1.20                 | –1.732  | 0.107      |
| Tax Legislations                                               | 2.60       | 2.50    | 0.89               | 1.18    | 0.10                  | 0.166   | 0.871      |
| Court Opinions and Regulations                                 | 2.80       | 2.92    | 0.84               | 1.16    | –0.12                 | –0.202  | 0.843      |
| Activities of Institutions Management and Employees            | 3.00       | 2.45    | 1.22               | 0.93    | 0.55                  | 0.986   | 0.341      |

'Activities of institutions management and employees' (mean score, 2.50) follow the above factors in terms of importance. 'Tax legislation' with the lowest mean of 2.45 is the least important cause of legal risk in PSBs. Like PSBs, 'court opinions and regulations' with a mean of 3.25 followed by 'activities of institutions management and employees' (mean, 3.00) is the most important and second most important cause of 'legal risk' in PBs. 'Tax legislation' acquires the 3<sup>rd</sup> place in terms of importance. 'New statutes' with the lowest mean of 1.75 is the least important cause of legal risk in PBs. The mean difference between the PSBs and the PBs is negative in case of each factor except 'new statute'. It implies that, on an average, the private sector banks assign higher importance to various factors causing legal risk than their counterpart, the public sector banks. However, the mean difference is insignificant in each case.

Table 18(b) indicates that 'activities of institutions management and employees' with a mean score of 3.00, and 'court opinions and regulations' (mean score, 2.80) are the most important and 2<sup>nd</sup> most important cause of legal risk in large banks. 'Tax legislation' (mean, 2.60) follows the above factors in terms of importance. 'New statutes' with the lowest mean score of 1.60 gains the lowest importance as a cause of legal risk in these banks. In small size banks, 'court opinions and regulations' turned as cause of legal risk followed by 'new statute' with a mean of 2.80. 'Activities of institutions management and employees' with the lowest mean score gains lower importance as cause of legal risk.

In the end, the bankers were asked about the approaches adopted by them for capital charge calculations for operational risk. Table 19 indicates that a majority of the banks use basic indicator approach as suggested by the RBI. The above analysis holds good according to sector as well as size of the banks. Standardized approach is favored by only one PSB and two PBs.

| Table 19: Approaches for Capital Charge Calculations                                     |           |                                    |                      |                  |                                  |             |                  |
|------------------------------------------------------------------------------------------|-----------|------------------------------------|----------------------|------------------|----------------------------------|-------------|------------------|
| Approaches                                                                               | Total     | Sector-Wise Frequency Distribution |                      |                  | Size-Wise Frequency Distribution |             |                  |
|                                                                                          |           | Public Sector Banks                | Private Sector Banks | Chi-Square Value | Large Banks                      | Small Banks | Chi-Square Value |
| Basic Indicator Approach                                                                 | 14 (53.8) | 12 (66.7)                          | 2 (25)               | 5.488***         | 5 (71.4)                         | 9 (47.4)    | 0.010            |
| Standardized Approach                                                                    | 3 (11.5)  | 1 (5.6)                            | 2 (25)               |                  | 1 (14.3)                         | 2 (10.5)    |                  |
| Advanced Measurement Approach (AMA)                                                      | 3 (11.5)  | 1 (5.6)                            | 2 (25)               |                  | 1 (14.3)                         | 2 (10.5)    |                  |
| No Response                                                                              | 6 (23.1)  | 4 (22.2)                           | 2 (25)               |                  | —                                | 6 (31.6)    |                  |
| Total                                                                                    | 26        | 18                                 | 8                    |                  | 7                                | 19          |                  |
| Note: Figures in parentheses are the percentage of total; *** significant at 0.10 level. |           |                                    |                      |                  |                                  |             |                  |

## Conclusion

This paper made an attempt to study the general risk management framework of scheduled commercial banks in India, with a special attention to operational risk management framework of Indian banks. The findings of the study are presented below:

- The bankers have responded favorably to Basel II implementation in India, as they believe that it will help the banks in dealing with risk more effectively and efficiently. All the banks in India, irrespective of sector and size, have defined their risk management policies;
- The results reveal that 'efficiency in operations' and 'uninterrupted operations' are the two most important objectives of risk management policy of public sector banks. However, 'preservation of reputation' has got higher importance in private sector banks, which indicates that private sector banks are more worried about their reputation. In the case of large size banks, 'survival of organization' is found to be the most important objective of risk management policy, however, small size banks emphasized on 'uninterrupted operations';
- Regarding the preparation of accounting books as per US GAAP, 84.5% of the banks have responded favorably;
- For measurement and management of risks, the RBI has directed banks to set up risk management committees and separate Credit Policy Committee (CPC), Credit Risk Management Committee (CRMC), Operational Risk Management Committee (ORMC), and Assets Liabilities Management (ALM) committee. This study indicates that more than 90% of banks have set up risk management committees. Other committees are set up by more than 50% of banks. This indicates that banks in India have started following a structured risk management framework;
- Regarding the extent of risk, the results reveal that 'credit risk' with the highest mean score in the public sector banks (5.56) and private sector banks (5.88) is the most important risk faced by them. Market risk and operational risk follow the credit risk in terms of importance. The same is true in the case of small size banks. However, market risk and operational risk have got the highest score of 5.43 in large size banks;
- The study further reveal that approximately 60% of the banks have designed their operational risk management framework on lines of new Basel capital accords. People and process are considered to be the most important sources of operational risk in many banks. No difference in the importance of these factors causing operational risk was found across the size and sector of the banks;
- Regarding the management of the operational risk, the findings indicate that the board of directors and operational risk management committees are responsible in a majority of the banks;

- As regards to identification of operational risk, the sector-wise results indicate that the experience of the banker plays an important role. The same holds true, when analyzed across the size of the bank;
- In a majority of the banks, the responsibility of presentation of operational risk monitoring report lies with the operational risk management unit. The important constituent of this report among the banks are 'operational information' and 'internal financial data';
- For proceeding towards the advanced approaches on the line of Basel II recommendations, many banks have set up trading and sales, retail banking, commercial banking and payment and settlement business lines for operational risk identification. For proper identification and assessment of risk among these units, many banks are following self risk assessment exercise in line with the RBI guidelines. The managements of many banks make the annual review of these tools;
- In order to address various business interruptions, many banks (70%) have set up disaster recovery plans and business continuity plans; and
- Finally, for operational risk capital charge calculation, many banks are adopting the methods recommended by the RBI. More than 50% of the banks are following Basic Indicator Approaches and a few of them have gone for Advance Approaches.

The study, therefore, reveals that irrespective of sector and size of the bank, operational risk management framework in India is on the right track and it is fully based on the RBI's guidelines issued in this regard. Many banks have set up risk management committees for the management of risks (credit, market, and operational). Credit risk is the most important risk confronted by the SCBs in India. In order to manage the operational risk, many banks have designed operational risk management framework on lines of Basel Accords. The 'board of directors' and 'operational risk management committees' are responsible for the management of this risk in many banks. The task of identification and assessment of operational risk (self risk assessment exercise) is based on the experience of bankers. On the lines of Basel Accord and the RBI guidelines, many banks have set up trading and sales, retail banking, commercial banking and payment and settlement business lines. As per the RBI guidelines, banks in India are following the Basic Indicator Approach for operational risk capital charge calculation.❖

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Reference # 37J-2008-12-03-01

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