

Erich R. Utz

**Modelling and Measurement Methods
of Operational Risk in Banking**




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List of contents

Introduction	1
Chapter One	7
Categories of Risk in Banking.....	7
1.1 Necessity of Risk Management in Banks	7
1.2 Legal Regulations as a Frame for a Risk Management in Banks	18
1.3 The Basel Committee Recommendations for Risk Management in Banking	32
1.4 Risk Management as an Essential Part of Banks' Economics	40
Chapter Two	51
Operational Risk as the Scope of Bank Activity Projection.....	51
2.1 Definition of Operational Risk.....	51
2.2 Contents of Operational Risks Elements and Features.....	57
2.3 Models and Measurement Methods of Operational Risk.....	65
2.4 Obstacles in Interpretation of Operational Risk in Banking	75
Chapter Three.....	83
Internal Structures of Operational Activity Processes in Banking	83
3.1 Identification of Main Areas of Operational Activity in Banking	83
3.2 Operational Management in Frames of Processing Approach Risk.....	90
3.3 Procedures Covering Operational Management in Banking	98
3.4 Human Dimensions of Taking Operational Decisions	107
Chapter Four	115
Interrelations between the Operational Risk Measurement and Consideration of Risk in Operational Decisions	115
4.1 Data Base Collection.....	115
4.2 Methodology of Risk Analysis and Calculation Transforming into Operational Decisions	121
4.3 Social Communication in Frames of Interpretation.....	131
4.4 Operational Risk Application of Operational Risk Evaluation into Operational Decisions	138
Chapter Five	146
Adaptation of Operational Risk Analysis to Operational Decisions	146
5.1 Processive Approach to Operational Decision Taking in a Bank	146
5.2 Necessity of Medium Management Staff Involvement in Operational Risk Control.....	152
5.3 Influence of Staff Education on Bank Management Quality	159
5.4 Basel Committee Proposal of Respecting Operational Risk in Banking	166

Chapter Six	175
Modelling of Bank Decisions System Respecting Operational Risk	175
6.1 Requirements and Elements of Modern Operational Decisions System	175
6.2 Streams of Information in Frames of the System	183
6.3 Monitoring of Decisions System Efficiency	191
6.4 Operational Risk versus Financial Reports in Commercial Bank	199
Chapter Seven	209
Tendencies in Operational Management Practice in Commercial Banks of Germany	209
7.1 Characteristics of Present Economic Position of Commercial Banking in Germany.....	209
7.2 Influence of Market Situation on Operational Management in Banking ..	221
7.3 The Proposals of Obligatory Periodical Risk Reports in Banking.....	229
7.4 Drivers and Obstacles in Improvement of Bank Operational Management in Commercial Banking.....	238
Summary	248
Appendix	255
Bibliography	265
List of Laws and Regulations	274
List of Schemes	276
List of Tables	278
List of Formulas	280

Introduction

It can be observed that the banking sector is characterised by increasing competition. This process is an expression by the internationalisation and the globalisation in the most powerful economies in the world under the framework of free capital market. Liberalisation and expansion of capital exchange, technology and flow of information are important reasons. Especially less economically developed countries are on the way to improve and increase their economic position. New challenges in the European Union, represented by with their new members, are confirming the change.

Liberalisation of economic markets has a large impact on the financial sector, especially on banks. Increasing exchange of goods and services between countries, commercial banking plays an essential role as arising of financial transactions. Rising competition positively influences the creation of new banking products and services. It can be observed expansion in electronic banking for fast payments, cash management for companies' liquidity control and new instruments like derivatives, such as swaps or mezzanine capital. With respect to this fast change, as described above and fast development in banking, there is an intensive request for risk management in financial institutions.

The main thesis of this work is:

Operational risk is treated as a neglected risk category through banks' management. Modelling, defining, describing the category and estimating by measurement methods and decisions of operational risk in banking improves the whole risk management. This includes processes with positive results by interpretation and judging the importance and reducing the potential of losses and lost money.

At present time, the opinion prevails that investing money in recognition and respect of this risk category, the risk management processes will bring no additional value for the bank. In the following thesis, there is intention to express, prove and

convince from the view of strategic management. It contains the proof of management opinion that it is not future oriented and it is important to realise and work on this risk category. It convinces that the failures associated with this type of risk in banking operations have negative effects on bank results. It is shown that operational risk is hard to manage as systems and methods for identifying and measuring are missing or are being misinterpreted by the responsible people. The main goal is to convince banks' management that it is an additional and future increasing value for the bank, by focussing on and managing the operational risk. Management's task should be to improve the overall position in banking, the economy and the sociology, by implementing operational risk management under a holistic bank risk management.

There are five main statements connected with the main thesis:

1. The activities in operational risk decisions will reduce losses and result in an increase of profit.
2. Policies, procedures and processes will become more effective. It will result in an improvement of orientation, lean processes and will support the process of defining strategy.
3. Bank's profit will increase through customers using financial services more intensively if they are more satisfied.
4. Managing operational risk is an economic need to reduce errors, losses and defaults in a structural manner. It strongly supports the fulfilment of regulators' requirements.
5. Operational risk as an essential risk in financial institutions depends on the bank's individual structure, operations, strategy, management decisions, staff and markets. This relates to all individual banks thereby protecting of national and international financial systems.

The main hypothesis is based on the presented important statements above. We expect that the decisions of operational risk in banking have to be an important future discipline. It should include the elements of risk identification and risk measurement methods, based on economic theory as well as legislation and regulators' requirements.

The following hypotheses are supporting the main thesis as listed:

- There is a need of a bank wide risk management including the main risk categories in banking as well as operational risk. It should be done by transformation of economic theory and science of business decisions into bank management's strategic and operational decisions, based on an economic improvement in banks.
- National and international bank wide guidelines and the exact definition of operational risk are still missing. Its interrelation with other risks, the communalities and differences of such risk categories have to be researched and highlighted with the view towards operational risk decisions.
- Defining clear and lean structures during operations in bank activities and processes is a guarantor of reducing errors and defaults and therefore a prevention of losing profit and customer reputation.
- A complete bank-risk-decisions-system supports the transportation of the bank strategy into the operational activity process.
- Operational risk decisions are different and depend on every single bank and on its operational activities and on its operational risk. The operational risk, in comparison with credit or market risk is caused by banks' own or external activities. This is the reason why it cannot be measured by the same assumptions.

The subject of risk management in banking is a crucial and wide field of activity already now and even more in future. The most important risk categories in banking are verified and their management is still a continuing development. The approaches and models are enlarged. There is an ongoing improvement especially regarding the details of implementation. The importance of risk management in intensive developed industrial countries is an essential pivot in a stable national and international financial world.

The need of risk management results in more and more open markets. Reasons are ongoing industrialisation of less developed economic countries and an increasing number of countries on the way to international economic integration. Exchange of goods, respectively currency by cash or cashless payments, credits and

fast developing derivative instruments in the international financial society are indicators for the need of managing and limiting risks in banking.

The task of risk management is **prevention** and **protection** of financial risks. Reducing **first** banks' **own** economic crisis and **second** national as well as international economic crisis is a request, concerning stability of financial systems.

Regarding the risk categories, we can observe that operational risk is seen as one of the eldest risks, but up to now rarely under managements focus. Operational risk has been discussed in banking for some time. Unfortunately, no consensus has been reached on a definition. Although banking regulations are pending, no clear understanding of operational risk decisions has emerged.

A holistic risk management in banking, an implementation of operational risk management, is the request and therefore necessary for every bank management. However, in future there will be an intensive increase and development in this risk category. The following **main drivers** for this development are caused by the requirements of national and international regulators:

- Legal requirements, based on the public law, the commercial code and in the annual report. This involves an essential part in risk management and is enlarged by operational risk decisions.
- Its scope and development as well as the economic point of view of this risk are causes.
- An enlargement and increasing intensity of competition in banking can be observed.

The first chapter describes the categories of risks in banking. It illuminates the necessity of risk management in banks and represents an analysis of the legal regulations. As a framework for management in banks and the Basel Committee's recommendations as international guidelines for risk management the research of risk management as an essential part of banks' economics is shown.

The second chapter presents the operational risk as the scope of bank activity projection. There operational risk is defined through analysis of different banks and theoretical definitions. After that, the contents of operational risks, elements and features are discussed. In connection with this result, models and measurement

methods of operational risk are presented. Concerning the interpretation of operational risk in banking obstacles are described.

Within chapter three, the internal structures of operational activity processes are presented. It is done by identifying the main areas of operational activities and by deriving from frames of processing approach to risks in relation with operational management. Furthermore, the procedures covering operational management and the impact of human dimensions of taking operational decisions are described. Procedures as the essential factors of influence are basis of the research and are demonstrated with examples and proposals.

The fourth chapter covers the interrelations between the operational risk measurement and operational decisions quantification. It is processed by using the data base collection. A methodology of calculation and analysis processing operational risk is proposed by presenting a measurement approach for operational risk. It is based on a limit escalation trigger and on an analysis of credit events in a commercial bank under the former researched aspects. Regarding the interrelations, there will be an evidence of the social communications with the frames of interpretation. At this stage, this is an important point in the area of operational risk decisions quantification. In addition, a new approach to calculation of bank services involving operational risk is demonstrated. The possibilities of operational risk decisions by application of operational risk evaluation into operational decisions by the approach of **accepting, reducing, avoiding and transforming the risk** are illuminated.

Concerning the structure of operational risk and operational management, the fifth chapter examines the adaptation of operational risk analysis to operational decisions. Concerning aspects of the processive approach to operational decision taking in a bank, a risk control loop is generated. It is presented its development, each operational process and its decision. Then the necessity of medium management involvement in operational risk control is highlighted and a proposal of integrating the staff into this risk management is presented. The influence of staff education on bank management is researched. Concerning the Basel Committee's

proposals of respecting operational risk streams of an adaptation, based on the Committees' suggestions are shown.

The sixth chapter examines the modelling of bank decisions system respecting operational risk. The analysis is in finding and defining the requirements and elements of modern operational decision system with respect to streams of information in the frames of the system. It is emphasised that there is the need of monitoring the system's efficiency. At this stage, the common and different goals and objectives of operational risk versus financial reports in commercial banking are discussed.

The last chapter analyses the tendencies of operational management practice in commercial banks in Germany. The characteristics of the present economic position of commercial banking in Germany are shown. It is based on main economic bank figures and ratios. In this context, an analysis of the influence of market situation on operational management with respect to banking institution competitors in Germany is presented. The proposals of obligatory risk report focus on the risk sustainability and present a holistic risk management report. It involves the important bank risks and the driving power and obstacles in improvement of bank operational management in commercial banking. Those are discussed, based on the methodology of micro and macro environment analysis including the theory of the model of intensity of rivalry, based on Michael Porter.

In addition, the following specific theories are involved: the Shareholder Value approach, based on Alfred Rappaport and the Competitive Strategy by Michael Porter as one of the most important strategies.

The research work is based on national and international source research such as scientific handbooks, laws and regulations, journals, publications of the Basel Committee as well as others. In addition, lectures and conferences on risk management, empirical analyses of statistical data and practical experience in bank risk management as well as historical events in banking are used. In this thesis, the application of the theory used in the manufacturing industry will be transformed to the commercial banking industry.

Chapter One

Categories of Risk in Banking

All of life is the management of risk, not its elimination.

Walter Wriston¹

1.1 Necessity of Risk Management in Banks

Risk is the fundamental factor that influences financial behaviour of any subjects involved in economics. It is why, when it occurs, it is uncertain, unexpected and may have strong economic results to banks. Recognising the worldwide economic affects of risk, international organisations demand to reduce risk. As well, the national regulations and banks' management support this demand concerning the affects. In consideration of the subject of occurring risk, a required financial system for effectively allocating available resources could help to reduce it. It will support to stabilise financial systems worldwide.

Among the existence of different risk factors, banking has gone through many structural changes over the last two decades. Major banks, operating on national and international scale have merged.² Also many financial institutions have become global players.³ Most banks like to increasingly aspire mergers and other relationships with financial institutions, particularly insurance companies. The named reasons are the

¹ It is worth to know that Walter Wriston shared the experience at that time as a chairman of Citicorp.

² Concerning German markets, we can find many examples like the merger of the Hypobank AG and the Bayerische Vereinsbank AG. Burgmaier, S., Der Neue Geist Des Hauses, Wirtschaftswoche Nr. 10 from 26.02.1998, pp. 56 – 63.

³ Americanizing Deutsche Bank, The Wall Street Journal Europe, Brussels, 26.11.1998. The Deutsche Bank acquires Bankers Trust in 1998. »Yet it is clear that Deutsche Bank's executives see a need for change, or they wouldn't have set their sights on Bankers Trust. Even in Germany, corporations have found other ways other than bank loans to raise money, leaving bankers scrabbling for income. So bankers have had to seek out other sources of revenue. Hence Deutsche Bank's bid for Bankers Trust and thus its venture into the treacherous but potentially profitable endeavours, such as proprietary trading, that are Bankers Trust specialties.«

effects of an ongoing intensive process of economic trade like exchange of goods and currency. Increasing profit is the overall bank management economic goal.

Table 1: Comparison of definitions of risk in business

Definitions of Risk			
Nr.	Uncertainty of risk	Definition of risk	Source
1	No expected changes of events.	Risk is the uncertainty combined with an event influencing the future profit.	Sinkev, J. F., Commercial Bank Financial Management: in the financial-services industry, 4 th ed., Macmillan, New York, 1992, p. 391.
2	No differentiation.	Risk is a hazard of a failure of performance, threat through wrong decisions and the hazard of a negative deviation of a target.	Schmoll A., Risikomanagement im Kreditgeschäft: Risikokontrolle und Risikosteuerung in der Bankpraxis, Manz Verlag, Wien 1993, p. 28.
3	The uncertainty is used for the designation of a condition, of which the prognosis and the result is not possible to calculate on a probability.	Risk is an uncertainty with the possibility of quantification.	Lange, O., Optymalne decyzje, PWN, Warszawa 1964, p. 195 ff.
4	Risk can be measured under the degree of assumption and psychological misrepresentation.	Risk is a combination of hazard. It is possible to measure and the risk is connected with a real case.	Pfeffer I.: Insurance and Economic Theory, Homewood II.: Pub. for S. S. Huebner Foundation for Insurance Education, Univ. of Pennsylvania, 1956, p. 42.
5	The uncertainty is subjective.	Risk objective depends on subjective uncertainty. Risk face changed with the uncertainty.	Willet, A. H., The Economic Theory of Risk and Insurance. University of Pennsylvania Press, Philadelphia 1951 (first edition in 1901), p. 6.
6	Uncertainty based on a change of a unforeseen event.	In general, risk is the hazard, that a real value of an event, based on unforeseen changes, deviates between a relevant impact and the expected value in a negative form.	Rolfes, B., ⁴ Gesamtbanksteuerung, Schäffer Poeschel Verlag, Stuttgart, 1999, p. 29.
7	No differentiation.	Risk is defined as a hazard with a negative deviation between the real and the expected result.	Schierenbeck, H., Lister, M., Value Controlling, R. Oldenbourg Verlag, München, Wien, 2001, p. 311.
8	No differentiation.	Risk is the volatility of unexpected outcomes based on the value of assets or liabilities of interest. There are various types of risk, which can be broadly classified into business and non-business risk.	Jorion, Ph., Value at Risk, 2nd ed., McGraw-Hill, New York, 2001, p. 3.

to be continued on p. 9

⁴ Professor Dr. Bernd Rolfes, a very well non excellent specialist for risk management in Germany, has the chair for banks and finance on the Gerhard-Mercator-University GH Duisburg. He is as well partner of the international well known Zentrum für Ertragsorientiertes Bankmanagement, Münster.

Table 1: Comparison of definitions of risk in business - continued from p. 8

Definition of Risk			
Nr.	Uncertainty of risk	Definition of risk	Source
9	Uncertainty as a probability.	Risk is: <ol style="list-style-type: none"> a) The possibility of loss or exposure. b) The probability or chance of loss. c) Peril which may cause loss. d) A hazard or condition which increases the likely frequency or severity of loss. e) Property or person exposed to loss. f) Potential money amount of loss. g) Variations in actual loss. h) Probability that actual losses will vary from expected losses. i) Psychological uncertainty concerning loss. 	Thornhill, W. Risk management for financial institutions, Bankers Publishing Company, Illinois, 1990, p 1.
10	Uncertainty of loss.	Risk does mean uncertainty of loss where the loss is caused by fortuitous, accidental, unexpected circumstances. This is defined as pure risk, as opposed to speculative risk which may result in loss or gain.	Maynard, H., B., Handbook of modern manufacturing management, McGraw-Hill, New York, 1970, pp. 9 – 78.

Source: Author's selection of definitions from financial publications

In recognition the situation above, the supervisors are focused on tasks, which today are termed and related to risk. For example, the risk of collapse of the banking sector at a regional, national or international area. In particular, supervisors are concerned and trying to prevent bank crisis, such as the **domino effect**⁵. The domino effect is the possibility that a failure by one financial institution might lead to failure in another, and then another, like a spiral. Results of financial risks will have negative affects under a world economic view.

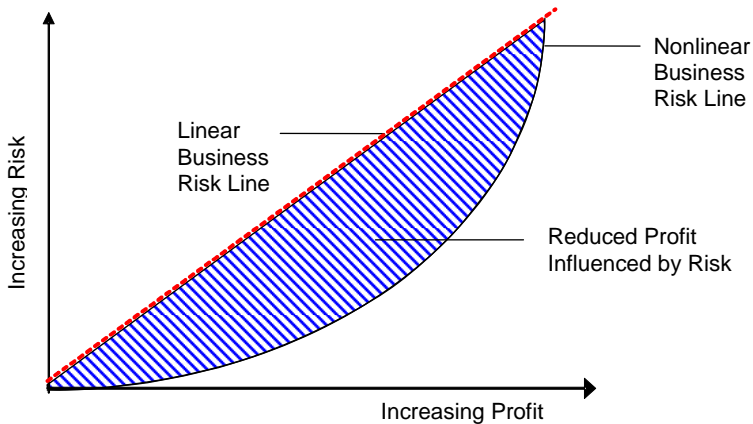
In a series of international recommendations like the Basel Committee, acts and laws, the individual governments tried to increase the stability of each single banking system. State bank supervisors are asked to keep and watch the bank regulations reaching this common goal. National and international supervisor goal, involving national government policies, is the order to avoid financial disasters resulting in economic crisis worldwide. Risk management in banking should reach this. As a conclusion, worldwide banking operations will become more safety, concerning economic financial risk aspects.

⁵ Croughy, M., Galai, D., Mark, R., Risk Management, McGraw Hill, New York, 2000, p.40.

Risk management requires risk definition. Table 1 provides a comparison of definitions of risk in business, presented as series of different definitions for the subject of risk. The approaches are predominant under the term of uncertainty. The represented risk definitions are all different and by that confirms the current situation that common definition does not exist. However, in the examined definitions there is a lack of the description of the possible positive impacts and therefore the chances in taking risks. Bank operations have been created under the focus of a profitable investment of the bank's capital.

Basically a bank invests capital under risk adequate opportunistic costs. That means bank operations are a more lucrative investment than in fixed income securities. For example, government bonds have not a large scale of risk, to get the invested money back and not to lose it. A state guarantees for the government bond, so the investment includes not any loss, based on the debtor. This results in smaller interest regarding to the bank profit.

Scheme 1: Basic relation between increasing profit and risk



Source: Author's concept

Earning more profit and value for a bank requires also to take higher risk. In financial environments, it is very well known that an investment with a higher risk may

increase the profit and the value.⁶ Scheme 1 shows the basic relation between increasing profit and risk. The linear business risk line, presented as a broken line, assumes a parallelism increasing between them. In this assumption, it will be the decision of any business management, how to create profit respecting risk. If this theory would be right, the business risk calculation could be done in exact way.

As it is known, the nonlinear business risk line depends on operation activities. This is because the increase of potential profit activates various different and multiple risks. Therefore, the relation between increasing profit and risk is nonlinear. The reduced profit influenced by risk is shown in the hatched area.

The word risk indicates not only dangerous and unexpected effects but chances as well. Including the described aspects above about bank risk, the following definition for risks in banks can be verified:

Every bank activity contains risk, based on banks operations. The risk, if it occurs, has negative influence on various levels in a bank immediately or in future. The time when the risk appears is uncertain. Risk can be divided in expected and unexpected events which can lead to losses. Financial institutions actively take risks, although the impact is not clear for the bank's judgement. In all cases, bank's estimation is that the chance to earn more profit in taking risk is higher than to loose profit and value. Based on this definition, the following aggregate risk formula 1 in banking can be build:

Formula 1: Aggregate risk formula in banking

$$\sum \text{all bank operations}_{\text{risky}} < \sum \text{bank profits and value}_{\text{actual and for the future}}$$

Source: Author's concept

Formula 1 shows, that the sum of losses of internal and external operations, based on taken banking risks, should be lower than the defined, planned and expected sum of profit and value up to now and for the future. Under this knowledge, it is obvious, that all bank management principles and practices are dealing with risks.

⁶ Banks have lot of possibilities, to invest their money. If the bank wants to earn more money for an investment, it gives the amount of investment not in a safety investment, for example public debtors, but to another borrower without such a good rating. It is the banks decision to give the loan to such a borrower in order to earn more money and to create more value. Finally, a bank accepts more risk when the profit is higher. However, a bank has to accept the probability of a credit loss in case of the borrower's insolvency.

Concerning commercial banks, it is important to manage their risk, because risk influences the economic situation of any financial corporation and even its existence. In order to improve the performance area⁷ in a financial institution it is imperative to analyze the processes and apply risk management studies to these processes.

Table 2: Definitions of risk management in banking

Nr.	Definition	Source
1	<p>Risk management is the part of management concerned with:</p> <ul style="list-style-type: none"> a) Conservation of already acquired assets against erosion or total destruction through accident. b) Safeguarding the firm's continued ability to earn in the face of possible accidental loss that could curtail or prevent continued earnings. This includes protection of a company's personnel. c) Overall responsibility for the astute buying of only necessary insurance, at favourable terms. d) The planning and supervision of noninsurance treatment of risk, i.e., outright intentional noninsurance programs; contractual transfer via noninsurance contracts, hold harmless indemnity contracts, bills of lading, net-net leases, and post-loss financing arrangements. e) Minimising the effects of losses within the insurance function, by supervising prompt and proper settlement or defences; and outside of the insurance function, by supervisions of previously planned emergency and catastrophe programs. f) Preloss and postloss auditing, security, engineering, and other reviews and analysis to prevent future losses. 	<p>Heyel, C., ed. The Encyclopedia of Management, 3rd ed., Van Nostrand Reinhold, New York 1982, p. 1053</p>
2	<p>Risk management of a corporation is regarded and managed under consideration of the uncertainties. A risk management approach includes for example the analysis of the strategic positioning of an enterprise and the development of measures to change the production depth or the reduction of dependency from suppliers and customers.</p>	<p>Oehler, A., Unser, M., Finanzwirtschaftliches Risikomanagement, Springer, 2001, p. 15</p>
3	<p>The essence of risk management, as a practical concept, is coordination of the means of control toward a defined integral objective attended by an organization to that end. Its basic principle is expressed in terms of the cost to a company of risk during a given period. This cost, briefly stated, is the sum of the cost of loss prevention, insurance premiums, losses sustained net of indemnities from third parties and insurers and financial and management expense.</p>	<p>Fallon, W., K., ed. AMA Management Handbook, 2nd ed., American Management Associations, New York, 1983, pp. 11 – 13</p>
4	<p>A management discipline whose goal is to protect the assets and profits of an organisation by reducing the potential for loss before it occurs, and financing, through insurance and other means, potential exposures to catastrophic loss such as acts of God, human error, or court judgements. In practice, the process consists of logical steps: risk or exposure identification; measurement and evaluation of exposures identified; control of those exposures through elimination and/or reduction; and financing the remaining exposures so that the organisation, in the event of a major loss, can continue to function without severe hardship to its financial stability.</p>	<p>Risk Management Glossary, Risk and Insurance Management Society, New York, 1985, p. 66 – 68</p>

Source: Author's selection of definitions from financial publications

⁷ In this case, performance area means the performance during the process of production and operations in banking.

Chapter Two

Operational Risk as the Scope of Bank Activity Projection

2.1 Definition of Operational Risk

In chapter 1.4, Risk management as an essential part of banks' economics, the basic risk categories in banking were briefly discussed. As a result, operational risk can be identified as a very young discipline in bank business. »If operational risk is one of the oldest risks in banking, the level of attention it is now receiving from customers, management, and regulators is very new indeed.«¹⁵⁶ Up until now, the basic risks were the market- credit-, liquidity- strategic- and legal regulatory risks. The operational risk has started to become an increasing role in banks' business now and in the future.¹⁵⁷

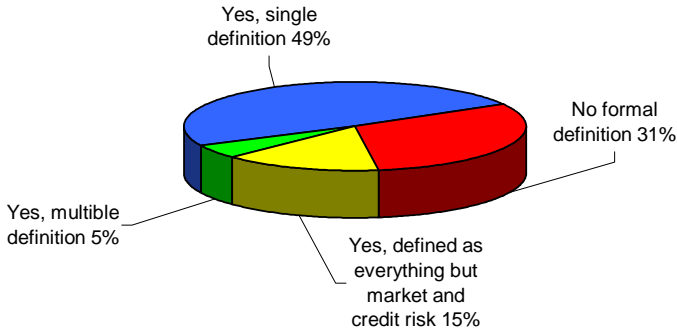
However, operational risk is not a new risk. It is obvious that it is the first risk in a bank to be managed, even before it starts to do its first business. Otherwise, it will not be able to accomplish its business tasks in the surroundings of its market. In this case, a company will lose its performance and therefore not be able to survive.

Concerning operational risk, it should be proved first if the operational risk is really a new thing within commercial banking risk management. The second prove should be whether the financial institutions have to cope with a major discipline by establishing its own management structure, tools and processes like other risk areas. As a third it should be proved if it is possible to define the operational risk such that it is no market or credit risk. In order to verify or falsify these statements, it is necessary to explore the definition for this kind of risk. Without a company wide valid definition, it is not possible to manage the operational risk. In theory, one can find a sum of different definitions to be applied to operational risk management in banking.

¹⁵⁶ Sweeney, T., British Bankers' Association, Grove, R., ISDA –International Swaps and Derivatives Association–, Executive Director and CEO, Sanborn, A., RMA, –Risk Management Association– President and CEO, Foreword to the BBA Study 1999, p. 4.

¹⁵⁷ See the examples of operational risk in subchapter 1.4, table 5.

Scheme 7: Formal definition of operational risk



Source: Author's own scheme, based on the data of the BBA-Study¹⁵⁸

With regard to the study concerning operational risk, The British Bankers' Association (BBA)¹⁵⁹, ISDA¹⁶⁰, PricewaterhouseCoopers¹⁶¹ and RMA¹⁶² investigated in their BBA Study 55 financial services organisations.¹⁶³ This study was published in 1999. The result was a formal definition of operational risk, shown in scheme 7 and interpret as follows:¹⁶⁴

Forty-nine of the responding financial institutions with an operational risk definition use a single, positive, and consistent cross-enterprise definition. A positive definition declares what operational risk is, while a negative definition states what it is not - for example market, credit or liquidity risk. The remaining participants answered the following: a negative definition, specifically, everything other than credit and market risk is used by 15 %. Multiple definitions have 5 % of the remaining companies.

¹⁵⁸ Ibidem, p. 30.

¹⁵⁹ The BBA has been active in the field of operational risk management since 1997. It is the leading trade association in the banking and financial services industry representing banks and other financial services firms operating in the UK, registered in London.

¹⁶⁰ International Swaps and Derivatives Association, incorporated, non profitable organisation, trade association, is the global financial trade association representing leading participants in the privately negotiated derivatives industry. There are offices all over the world, headquarters New York, USA.

¹⁶¹ PricewaterhouseCoopers International Limited, UK.

¹⁶² Risk Management Association is a non-profit member-driven professional association. It is the leading association of lending, credit, and risk management professionals, serving the financial services industry. It is registered in Philadelphia, PA, USA.

¹⁶³ British Bankers' Association, ISDA, RMA, Operational Risk The Next Frontier, PricewaterhouseCoopers, Chapter 4, Philadelphia, 1999, p. 4.

¹⁶⁴ Ibidem, p. 30.

Without a formal definition were 31 %. As a result, it is valid that every examined institution has its own definition or no definition under operational aspects.

As a result, one can conclude that operational risk does not really exist as a management focus and the definition is not clear enough.

Table 6: Collection of definitions of operational risk

Association	Definition ¹⁶⁵
British Bankers' Association, London	»Operational Risk is the risk of direct or indirect losses resulting from inadequate or failed processes, people, and systems or from external events.« ¹⁶⁶
Group of 30, Washington	»The risk and losses occurring as a result of inadequate systems and control, human error, or management failure.« ¹⁶⁷
Basel Committee, Basel	»Operational Risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk. However, strategic and reputational risk is not included in this definition for the purpose of a minimum regulatory operational risk capital charge. The Risk Management Group confirms that this definition does not include strategic risk; the operational risk charge will be calibrated accordingly. The Committee intends to work with the industry further on this topic.« ¹⁶⁸
Dresdner Bank AG, Frankfurt/Main	Operational risk is the risk of losses from inadequate or failed processes, control or projects, resulting from technology, staff, the organisation or external factors. ¹⁶⁹
Federal Association of Public Banks in Germany, Berlin, (VÖB, Bundesverband Öffentlicher Banken)	Operational risk is the risk of direct or indirect losses, resulting from inadequate human behaviour, process- and control weakness, technical failure, catastrophes and other external events. Across from the other definitions, catastrophic losses are explicitly considered. Legal risks are not included. The strategic risk has its own definition and therefore stays an own identity. ¹⁷⁰
Federal Reserve Bank of San Francisco, San Francisco	»Operational Risk arises from the potential that inadequate information systems, operational problems, breaches in internal controls, fraud, or unforeseen catastrophes will result in unexpected losses.« ¹⁷¹
Deutsche Bank AG, Frankfurt, Main	Operational risk is the risk of potential losses in the area of employee, technology, projects, property, customer relationship, other third parties and regulators, f. e. unforeseen events, operating interruptions, unreasonable or undefined or not kept operating structures or the failure of control or systems. ¹⁷²

Source: Author's concept, based on the selected sources

¹⁶⁵ German definitions are translated into English by the author.

¹⁶⁶ British Bankers' Association, ISDA, RMA, Operational Risk The Next Frontier, Pricewaterhouse Coopers, Chapter 4, Philadelphia, 1999, p. 29.

¹⁶⁷ Van den Brink, G., Operational Risk, Rowe Antony Ltd., Great Britain, 2002, p. 2 and Van den Brink, G., Operational Risk, Schäffer Poeschel Verlag, Stuttgart, 2001, p. 1.

¹⁶⁸ Basel Committee on Banking Supervision, The New Basel Capital Accord, Basel, January 2001, p. 94, with Bank For International Settlements, Working Paper on the regulatory treatment of operational risk, Basel, September 2001.

¹⁶⁹ Busch, I., Dresdner Bank AG, lecture in Euroforum Deutschland, Düsseldorf, 17. – 18. April 2002.

¹⁷⁰ Eller, R. Consultant of Roland Eller, lecture in Euroforum Deutschland, Düsseldorf, 17. – 18. April 2002, p. 31.

¹⁷¹ Federal Reserve Bank of San Francisco, Economic Letter, Nr. 2002–02, January 25, 2002.

¹⁷² This definition is from Mr. Fred A. Peemöller, the Chief Risk Officer for operational risk in the Deutsche Bank. Peemöller, F./Friedrich, R., in: Eller R./Gruber, W./Reif, M., Handbuch Operationeller Risiken, Schäffer Poeschel Verlag, Stuttgart, 2002, p. 45.

In order to find a common definition of operational risk, it is necessary to look for a theoretical valid definition in banking with the task of a possible practical approach for dealing with this risk in financial institutions. This is an important request.

Refer to table 6, a collection of definitions of operational risk, used by representative banks and associations, is shown. Based on this research, the definition of operational risk is not clear, because there are different. Concerning operational risk, there could be a lot of negative influences in analysing, identifying, measuring, interpreting and managing financial institution. The negative influences will result in losses and reduce commercial bank profit. For example, when the bank loses its predefined focus, the understanding within the company concerning the staff, the management and the risk policy could lead to misinterpretations and as a consequence, the success and profit in a financial institution may not be achieved as originally planned by the management.

Table 7 : Collection of definitions of operational risk in bibliography

Author	Definition
Jorion, Ph. ¹⁷³	Operational Risk generally can be defined as arising from human and technical errors or accidents. This includes fraud, management failure, and inadequate procedures and controls. Technical errors may be due to breakdowns in information, transaction processing, settlement systems, or, more generally, any problem in back-office operations, which deal with the recording of transactions and reconciliation of individual trades with the firm's aggregate positions.
Croughy, M., Galai, D., Mark, R. ¹⁷⁴	Operational risk is the risk associated with operating a business. Operational risk covers such a wide area, that a subdividing of this risk into two components, operational failure risk and operational strategic risk is necessary. Operational failure: coming out from the potential for failure in the course of operating in business. Defining a business plan people, processes and technology are contents.
Marshall, Ch. ¹⁷⁵	Operational Risk is the potential for any distribution in the firm's operational processes. Distribution may come from one-off events, ranging from rogue trading and accounting mistakes to terrorist activities and landmark legal settlement, and from improper sales practices and systems failure to sabotage, regulatory violations, and supernatural events.
Hoffman, D. ¹⁷⁶	Operational risk/exposure class definitions: relationship risk, people/human capital risk, technology and processing risks, physical risks and other external risks.

Source: Author's concept, based on the listed sources

¹⁷³ Jorion, Ph., Value at Risk, 2nd ed., McGraw-Hill, New York, 2001, p. 18.

¹⁷⁴ Croughy, M., Galai, D., Mark, R., p. 478 – 479, Risk Management, McGraw-Hill, New York, 2001.

¹⁷⁵ Marshall, Ch., Measuring and Managing Operational Risk in Financial Institutions, John Wiley and Sons, (Asia), 2001, pp. 24 – 25.

¹⁷⁶ Hoffman, D., in Andersen, A., Operational Risk And Financial Institutions, Risk Books, London, 1998, pp. 29 – 42.

In order to provide an overview of the current scientific definitions, table 7 presents a collection of definitions of operational risk in bibliography and shows further operational risk approaches by different authors. This point of view is also necessary for respecting and judging the items of operational risk. Concerning the definitions in table 7, one can observe that there is a split up in different elements which are mainly common.

Table 8: Matrix analysis of operational risk definitions based on selected organisations, banks and bibliography

Category	general risk of loss, existing differentiation in direct/indirect			people	process	systems	external events		internal events and organisation	control	projects	technology	other operational risk problems
	no diff.	direct	indirect	Explicit additional management failure		explicit additional information risk	Explicit additional strategic risk	explicit additional catastrophic /legal risk					
Basel Committee*	X			X		X	X	X	X legal	X			
BBA-Study		X	X	X	X	X	X	X					
Deutsche Bank	X			X				X	X legal	X	X	X	X
Dresdner Bank	X			X		X		X		X	X	X	X
FR San Frisco	X					X	X	X	X catastrophic	X	X		X
Group of 30	X			X	X	X				X			
VöB		X	X	X		X		X	X catastrophic				X
Bibliography													
Jorion, Ph.	X			X	X	X	X			X	X		X
Croughy, M., Galai, D., Mark, R.	X			X	X	X	X	X		X	X		X
Marshall, Ch.	X			X		X	X		X catastrophic	X			X
Hoffmann, D.	X			X		X		X	X catastrophic				X

* management failure, strategic and reputational risk are not in the view of the Basel Committee

Source: Author's concept, based on table 6 and 7

Considering table 8, a matrix analysis of operational risk definitions based on selected organisations, banks and bibliography, used in table 6 and 7, represents the researched risk categories, which are incorporated in the definition of their operational risk category. Referring to operational risk definition, one can conclude that the definitions are different. However, it also can be seen that some categories occur more often. Appreciating the selected operational risk definitions, there is no predominant definition although there are many common elements.

In a summary, it is valid that the operational risk is defined by commercial banks as well as in theory. The definitions are done under different aspects, seen as elements. However, the analysis results that there are as well common elements. Referring to Croughy, M., Galai, D., Mark, R., they are authors, who take also the strategic risk into the definition. Under a total approach of operational risk, taking strategic risk into the definition, this is a new one and comprehensive. The reason is that there are a large number of strategic decisions in a financial institution, which have operational effects concerning operational risk. This occurs for example in implementing new business lines without any proper business processes, systems or enough know how about the new business line. Such a new business line may be mezzanine loan¹⁷⁷, which represents in practice a high potential of risk. The risk can increase based on a credit event or errors in internal proceeding. With respect to the accounting, in both cases the loss is treated as a **credit loss**, although in case of proceeding errors it is not a credit loss.

Analysing the different approaches of definitions, the following core definition for operational risk can be extracted. Operational risk contains the following approach:

“Operational Risk is the internal risk of direct or indirect failures and losses, resulting from inadequate human behaviour, system-, process- and control weakness, technical failure, catastrophes, management failure, reputational risk and other external events”¹⁷⁸

In this context the term failure means, that there are weak processes in operations, but often there are no monetary losses. Therefore, the definition is extended by failures. In the framework of other risks, operational risk could overlap these risks. Under this consideration, the strategic and legal risk is included. The above definition will be used for further discussions related to operational risk.

Regarding the three hypotheses at the beginning of this subchapter, the extract is as follow: Operational risk is not a new risk category and can be discovered in every financial institution since the beginning of any operation in business. Based on the risk

¹⁷⁷ Mezzanine as a architectural term meaning an intermediate storey between two floors of a building and in corporate finance a hybrid type of finance with the task close the gap between loan capital and equity.

¹⁷⁸ Author's definition, based on the researched material.

Chapter Three

Internal Structures of Operational Activity Processes in Banking

3.1 Identification of Main Areas of Operational Activity in Banking

After verifying obstacles in interpretation of operational risk, for operational risk management it is necessary to define the internal structures of operational activity processes in a bank. Developing the management of this risk category in commercial banking, identification of the main areas of operational activity should be done.

The identification is the basis for later judgement, measurement and management inside a total commercial bank risk management process, involving operational risk management. Otherwise, it will not be possible to develop operational risk management. In principle, the best way for identification is to analyse a commercial bank structure.

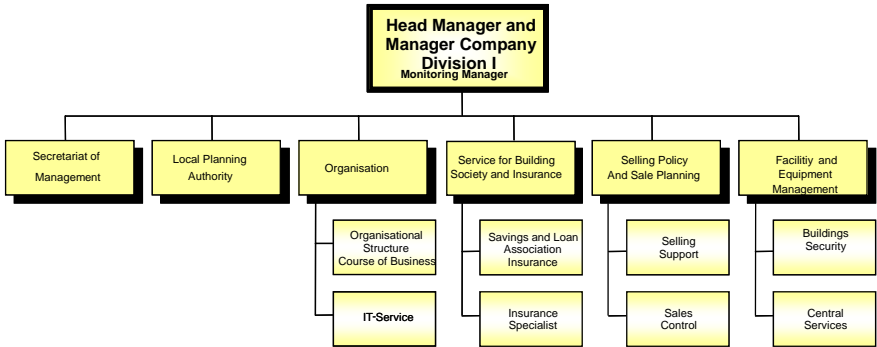
To handle the shown dependencies under operational risk management aspects, one can observe the structure of a bank is not often similar to its business lines. As an example, the usual structure of a commercial bank will be used to identify existing operational risk activity problems. A case study research supports the process of identification of operational activity.²⁴⁹ It will be reviewed whether the result is meaningful, to identify the main areas of operational activity by using the structure of a financial institution.

The following schemes 11 to 14 figure a typical structure in a commercial bank division I, shown as I a and I b, to division II and III. They represent a generic bank structure, which can be found within a lot of cooperative-banks, private banks and savings banks. This type of bank structure introduces three leading managers, one

²⁴⁹ The research based on the structure of the Researched Savings Bank, a German savings bank with commercial banking operations. The number of employees is about 800 and a total balance sheet of 2, 3 billion €.

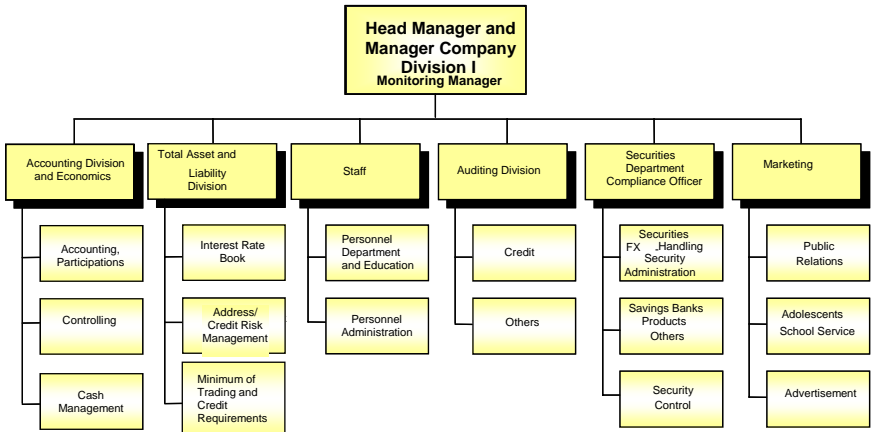
responsible for each division. The head or chief manager leads the division I. He is additionally monitoring manager.²⁵⁰

Scheme 11: Typical structure in a commercial bank division I a



Source: Author's concept

Scheme 12: Typical Structure in a commercial bank division I b



Source: Author's concept

²⁵⁰ Ibidem.

All strategic internal departments are subordinated and report him. These are:

- the secretarial administration of the management, which is a kind of back office for the managers;
- the local planning authority with responsibility for the operative and strategic plan;
- the department of organisation, responsible for bank's structure, based on the dependence of the management and in addition responsible for planning all technical processes involving IT-environment;
- the service for house building society and insurance with the task of a bank wide competence centre²⁵¹ in this special part;
- the department of selling policy and sale planning for the operative business with the task to support the distribution channels;
- the department of facility and equipment management which is responsible for the own affairs in the bank, like buildings, tenancies, insurance, the car fleet and the whole procurement for bank dependent and independent affairs;
- the accounting and economic division,
- the total asset and liability division for managing the complete bank involving risk management on total bank level,
- the personnel department for recruiting and further education of the employees and personnel administration;
- the auditing division for internal supervisory;
- the securities department as back office for trading and sales as well as custody;
- the marketing department responsible for public relations, school saving service and advertisement.

The second manager has the role of the deputy manager and manages division II, which includes the total lending business, the real estate loans and private loans. The lending, also called credit business, involves the private and the corporate business. In this case, he is also responsible for the credit or lending business in the branches and therefore an overlap between the company division of the third manager. The area of insolvency, loan losses and law belongs also to the division II. The deputy manager is also responsible for the trading business in the bank as well as for the total credit back office.

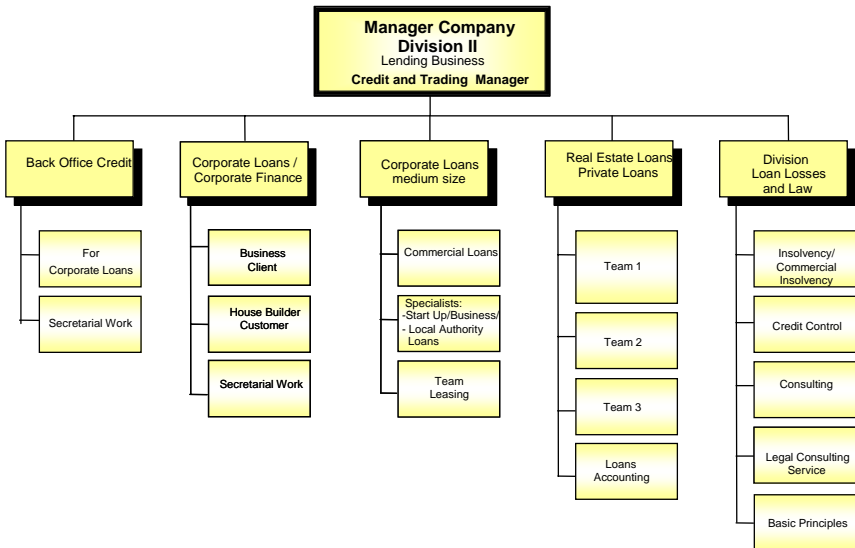
The third leading manager runs the division III which includes all business affairs that belong to the market and therefore to all branches. The departments of the back office of the market like payments, e-commerce, electronic banking and the area of multi-channel banking²⁵² as well as the real estate business, the investment centre for private banking and the international department for foreign affairs.

²⁵¹ A competence centre serves for specific commercial bank activities. Such are leasing, factoring, real estate loans and insurance services. It supports commercial banking kernel business and gives specific and detailed information for bank branches service employee.

This typical structure of a bank shows that there are common bank procedures between division II and division III. The service in the branches for private customers is also available for business customers, such as corporate finance customers. Based on this, one can see that it is not possible to derive a proper identification from the presented structure. It is too superficial and does not support to identify the main areas of operational activities.

There are too many overlaps in this structural approach. For example, a corporate customer asks in one of the branches for a credit, but the approval has to be provided by the company division II. That is the reason why the identification of the main areas of operational activity processes should be done in another way.

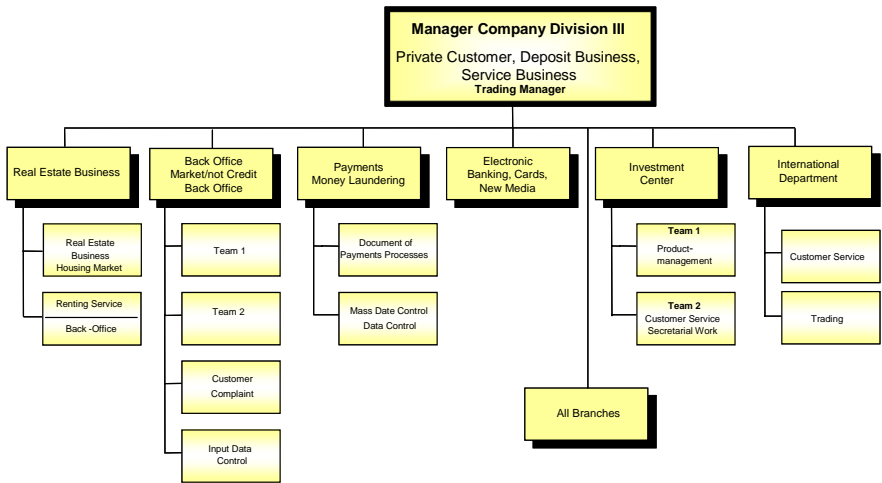
Scheme 13: Typical structure in a commercial bank division II



Source: Author's concept

²⁵² Gerdes, B., Patzwaldt, U., Eickhoff, A., Können Multi-Kanal-Banking und Kundenbindung ein Gespann sein?, Betriebswirtschaftliche Blätter 05/2000, pp. 235 – 237.

Scheme 14: Typical structure in a commercial bank division III



Source: Author's concept

Future regulators requirement of structural and organisational segregation of functions inside the credit business will support a better identification of operational activities.²⁵³ Based on regulators, there is a request of segregation between market operations and acquisitions on one side and the back office operations on the other.²⁵⁴

Respecting the situation above in recognition of many operational activity overlaps, the approach of the organisational structure for identification of the operational activity process can not be seen as a valid one.

Another approach to find these areas is to analyse the business lines, which are the same as business fields or fields of activity in banking. Important is to consider the internal and external operational risk elements and features, as described in table 9 of subchapter 2.2. The differentiation of the actual business lines must follow the business line approach of primary and supporting activities in commercial banking with

²⁵³ The new „Minimum requirements for the credit business of credit institutions“ and Basel II, Deutsche Bundesbank, Monthly Report, Frankfurt, January 2003, p. 48.

²⁵⁴ Principles for the Management of Credit Risk, Basel Committee on Banking Supervision, Basel, September 2000. For credit business, there are simplified rules for lending transactions below certain thresholds, which are to be defined by banks individual under risk aspects. Source: The new „Minimum requirements for the credit business of credit institutions“ and Basel II, Deutsche Bundesbank, Monthly Report, Frankfurt, January 2003, p. 49.

respect to internal and external operational risk elements and features.²⁵⁵ Table 12 represents this approach.

Table 12: The business line approach of primary and supporting activities in commercial banking

Banking activities					
Primary activities			Supporting activities		
Business lines					
Retail activities	Corporate business activities	Trading and Sales	Management	Organisation	Employee area
Retail Banking	Corporate and commercial banking	Trading and Sales for Customers	Business-planning	Processing management	Employee and leadership
Private Banking	Local authority banking	Trading and Sales for own-account: shares and own funds	Management of profit, performance and risk, includes customer business	Banks - structure	Internal communication
Mortgages	Correspondent banking	Own refinancing of loans	Management of the distribution channels	Information technology IT	
Funds management	Payment services	Asset Management	Management of productivity and costs	Building and room organisation	
Insurance	Treasury services		Internal supervision		
Real estate business	Private trust and executory		Observance of all legal regulations		
Renting service	Structured finance				
Credit cards	Custody				
Share dealing	Leasing				

Source: Author's concept

This assessment is supported while looking to the structure of the business lines of financial institutions. The business lines of a commercial bank define the field of activities and its operations. This is an essential realisation. Usually the following subjects of banks activities are responsible establishing business lines: the management, the board and the shareholders.²⁵⁶ In banks, the business lines are an outcome of the subjects' definition and influenced by the following claimant groups: the

²⁵⁵ Rappaport, A., *Creating Shareholder Value*, The Free Press, New York, 1986, pp. 81 – 88.

²⁵⁶ The business line approach supports measuring the performance of each single business line. Recognising more or less performance, there is a better possibility influencing and managing business lines more detailed.

Chapter Four

Interrelations between the Operational Risk Measurement and Consideration of Risk in Operational Decisions

4.1 Data Base Collection

After describing measurement methods and the role of internal structures of operational activity processes, the subject of operational decisions quantification is the next step for a further consideration. There are interrelations between measurement and quantification of operational risk, which have to be researched. The reason for it is that a judgement of the operational risk is not possible without connecting measurement and quantification.

In subchapter 2.3, models and measurements methods of operational risk are discussed and, referring to table 10, a collection of top-down and bottom-up risk model types and their conceptual features are presented. As a result, among other models, the data based loss potential model, a statistical model, was named and preferred. The advantage of a loss database is that the loss event database captures and accumulates banks individual loss events with respect to its businesses and risk types. This information is detailed, in structured manner and in logical sequences. Therefore, the data-collection is an especially detailed method because there are still no other tools for a data-capture and measurement.

Based on missing historical data about operational risk events, as noticed in former chapters, the loss event database is the first step in measuring and quantifying operational risk. Therefore, the loss event database is the most important model in starting operational risk decisions in commercial banking.

An essential foundation for any rigorous operational risk decision process is comprehensive, reasonable, verifiable and validated data covering the historical operational risk loss experience of the bank. The discipline of collecting loss data is not

only needed to understand the dimensions of operational risk the bank faces. It can also be used to motivate staff to consider and more actively control key elements of operational risk.

The discipline of bank-wide data collection promotes a dialogue within the bank about determining the major operational risk exposures and drivers and reinforces more qualitative efforts to manage operational risk within each of the business lines. To the subject of business lines see subchapter 3.1, where identification of the main areas of operational activity are stated. Thus, it is a sound practice for financial institutions to have a framework for collecting data on their actual operational risk loss experience within material business lines. Events are described and stored in various locations for analysis.

Operational risk loss data consists primarily of routine, generally high-frequency, low-impact events, as well as low-frequency, high-impact events. In future, banks have to implement reporting systems to track both types of loss events, including reference to external data on large loss events for an operational risk quantification.

Average losses or expected losses in a bank are generally driven by the high-frequency and low-impact events. Currently, there is no active recording of these losses, because of a missing active decision quantification of operational risk in commercial banks.

These expected losses generally should be budgeted with a high degree of confidence and routinely flow through annual prediction of the income statement, also called prognosis calculation. In contrast, unexpected losses – which tend to reflect the impact of low-frequency, high-impact events – occur infrequently and are sometimes sufficiently large as to result in a periodic loss and reduction in the regulatory tier one capital.²⁹³ For a measurement, the data should be collected and registered in the database. Based on this collection, it is a quantitative method of operational risk events measurement.

Creating a loss database it is important that the chosen scheme fit for all operational risk elements, described in subchapter 2.2 as contents of operational risks elements and features. Referring to this subchapter as a repetition, those are external and internal, such as people, systems and technology, processes, management failures including strategic management risk and reputational risk. For a forward-

²⁹³ Tier one capital is the same as core capital of a bank. For more information, regard to subchapter 1.3, The Basel Committee Recommendations for Risk Management in Banking.

looking database system, it will be an advantage to create detailed selected operational risk event type categories, represented in the following table 16.

Table 16: Selection of detailed operational risk event type-categories

Detailed event type categories		
Nr.	Risk Category Level 1	Definition
I	Internal fraud	Losses due to acts of a type intended to defraud, misappropriate property or circumvent regulations, the law or company policy, excluding diversity/ discrimination events, which involves at least one internal party.
II	External fraud	Losses due to acts of a type intended to defraud, misappropriate property or circumvent the law, by a third party.
III	Employment practices and Workplace Safety	Losses arising from acts inconsistent with employment, health or safety laws or agreements, from payment of personal injury claims, or from diversity / discrimination events.
IV	Clients, products & business practices	Losses arising from an unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements), or from the nature or design of a product.
V	Damage to physical assets	Losses arising from loss or damage to physical assets from natural disaster or other events.
VI	Business disruption and system failures	Losses arising from disruption of business or system failures.
VII	Execution, delivery & process management	Losses from failed transaction processing or process management and from relations with trade counterparties and vendors.
VIII	Mergers and acquisitions	Buy or a takeover / unfriendly takeover of banks or financial institutions, based on former legally and economically independent companies.
IX	Control failure	Losses based on improper transactions, which are not under a control authority.

Source: Author's concept²⁹⁴

The approach of risk type categories based at the first time on the study called »Operational Risk Management – The Next frontier« of the British Bankers' Association, ISDA, RMA, PricewaterhouseCoopers, Philadelphia, 1999.²⁹⁵ In a further

²⁹⁴ Based on individual workshops between:
Hannemann R, Bundesverband öffentlicher Banken Deutschland, Bonn 21.02.2002.
Leopold, T, BearingPoint AG, Formerly KPMG (Klynveld, Peat, Marwick, Goerdeler), Augsburg, 06.12.2002.
Naumann, M., operational risk manager of the Bayerische Landesbank, München, 28.0.2003 and the author for defining operational risk categories in banking.

²⁹⁵ The study surveyed 55 financial institutions, which has been a significant focus on development of risk management for market and credit risks over the past 10 to 20 years. Now, the recognition of operational risk management in financial institution as a separate discipline has occurred primarily during the last view years.

modification, based on individual operational risk workshops²⁹⁶, it supports the quantification of the categories of operational risk types. It became more detailed for getting more information about risk events with the possibility of a quantitative measurement, shown in the selection of table 16.

The represented IX categories are additionally an outflow of the preceding subchapter 2.2., which represents the contents of operational risks elements and Features. In this subchapter, especially table 9 pictures the internal and external operational risk elements and features in connection to scheme 16 the value added chain, which describes process flows. The approach to involve the subject of mergers and acquisitions is new. However, looking into daily press one can simply recognise, that many firms were taken over from other competitors with a more specialised strategy. Recognising these takeovers, this operational risk category supports to reduce operational losses.

For example, the German mobile telephone company D 2 Mannesmann mobile AG was a victim of an unfriendly takeover from the British telephone company Vodafone in 2000.²⁹⁷ Mannesmann executive, Dr. Klaus Esser, fought until the end against this attack.²⁹⁸ This fight caused in considerable financial losses inside the firms and as well as lost reputation by customers.

Control failure is another area, which should be included in the categories like described in subchapter 3.3, referring to procedures covering operational management.

The event type categories were divided in a three level approach, shown in the appendix 7 on example of the operational risk category people²⁹⁹. The first level is the main level; the second is the sublevel and a more detailed category and the third level special describes activity examples. Following this procedure is a guarantor for a systematic building structure of the database. During this three-level-approach in every operational risk category, employee in a clear structure can record the database in a

²⁹⁶Based on individual workshops between:

Hannemann R, Bundesverband öffentlicher Banken Deutschland., Bonn 21.02.2002.

Leopold, T, BearingPoint, Formerly KPMG (Klynveld, Peat, Marwick, Goerdeler), Augsburg, 06.12.2002.

Naumann, M., operational risk manager of the Bayerische Landesbank, München, 28.0.2003 and the author for defining operational risk categories in banking.

²⁹⁷ Seidlitz, F., Harte Kritik am Mannesmann-Prozess, Die Welt, Frankfurt/Main, 02.04.2004.

²⁹⁸ Christiansen, F., Ermittlungen zu Mannesmann/Vodafone in der heißen Phase, Heise online, Heise Zeitschriften Verlag, München, 31.07.2002.

²⁹⁹ For the operational risk categories in see table 9: Internal and external operational risk elements and features in subchapter 2.2.

not complicated manner. If the levels and categorisation will be still accepted by a large number of commercial banks, an exchange of data will be possible in the future.

Before implementing a data loss collection, a commercial bank must be sure what the right contents of such a tool are. As an outflow of the study,³⁰⁰ a database should include the following information:

- Empirical analysis: what has happened during the study, banks can assess current policies and control and gain comfort on their effectiveness. Collecting and analysis information and classifying it by risk, control point, or other determinants helps identify trends and focus resources on the key issues.
- Quantifying the amount of loss from operational risk: accumulating the loss from events set the value proposition for the decision quantification of operational risk. The losses are listed, categorised and a continuous improvement will be seen over time.
- Modelling of operational risk: the rough data can be used to create a predictive and causal model of risk. For the management the data is important for determining the most efficient level of mitigation and investment.

In banking, it is very necessary to find an approach for a risk quantification and measurement. Only now a further operational risk management procedure can be done. Referring employee, an event database must be simple in the daily application in an organisation. Concerning a detailed quantification, there should be the possibility for building clusters and sub clusters and finally aggregating on bank level. Therefore, the following requirements on an event database are needed:

- a) Current data to enable any further analysis and evaluations that management may need for a proper understanding of the reported data and the actions, which are necessary to reduce or eliminate them. This means that the basic data must be held at the transaction level, rather than being aggregated before being fed into the database.
- b) A differentiation in the main risk categories of operational risk as shown in table 9 in subchapter 2.2.

³⁰⁰ British Bankers' Association, ISDA, RMA, PricewaterhouseCoopers Operational Risk, p. 67, The Next Frontier, RMA, PricewaterhouseCoopers, Philadelphia, 1999.

- c) The database collection should be able for a sorting under aspects of age, value, product and location as well as the categorisation and finally in aggregate form on bank management level. It is important for further operational risk decisions.
- d) The cause of decision event and the occurring areas.
- e) The amount of money the loss takes.
- f) A construct of the database in form of a tree.³⁰¹ That means creating event levels and sub-levels for a better differentiation of the occurring losses.

For analysing and preventing of losses, the involved transactional levels³⁰² should be informed about originate losses under their process tasks. This is the method to make concerned people to involved people for making things better.

Concerning further steps in operational risk decisions, the recorded database collection events should contain detailed information. This is an important function, because the chosen kind of activities referring to operational risk management should reduce or eliminate the future exposures. Continuing thoughts about possibilities are how losses can be shifted. An example is in closing an insurance contract for a particular event.

In recognition of the risk-categorisation and sub-categories approach on example of people, presented in appendix 7, the most important thing is that every data collection will represent banks' individual business. Considering this aspect, there should be an adaptation to individual commercial banking operations. Therefore, the business line analyse as the identification of main areas of operational activity, discussed in subchapter 3.1, is first to be done. After this identification, the individual risk categories can be defined precisely and operational risk management implementation can be done standardised.

When the main operational risk features are defined and described, the database collection can be created on the operational risk main categories external, internal, people, systems/technology, process, management failure and reputational risk. Referring to table 16, the detailed event type categories can be included in

³⁰¹ Baum, H.-G., Coenenberg A., Günther, Th., Strategisches Controlling, 2. Auflage, Schäffer Poeschel Verlag, Stuttgart, 1999, p. 298: a decision-tree dismantles decisions in single activities. Those are judged under likelihood. Subchapter 2.3 describes the event tree.

³⁰² The units where the operational risk events occur.

database for each main feature of operational risk. A possible approach is done in appendix 7 as an example.

Nowadays, it is missing the possible to get external data losses, because the commercial banks will not have or give any information about losses in business. Based on less developed and experienced existing database of operational risk events, as stated in this work before, it appears not meaningful, to work with such external material at the beginning of operational risk management. In the future, when the subject of operational risk is standardised implemented in banking industries decision levels, it will be advisable, to exchange external data losses experienced in other banks. At last, a series of data is required, with a minimum of a few years for an representative optimum analysis and for using the information in the data pool for calculating risk events based on causes.

As repeated in the text above, management should respect, that first it is important to build an event database in structural manner. It should be done under the focus of the individual commercial banking operations to provide a basis for operational risk management. In order to get the expected and meaningful results methods for calculation and analysis have to be defined and developed.

4.2 Methodology of Risk Analysis and Calculation Transforming into Operational Decisions

The analysis of the data collection provides information about

- event losses,
- the occurring operating sector,
- improper processes as well as
- the amount of losses, measured in the number of occurrence and
- the amount of money losses among other things.

The output of this information should find place in banks calculation. The database collection gives also information about the following losses:

- expected loss
- unexpected loss and
- catastrophic loss.

Chapter Five

Adaptation of Operational Risk Analysis to Operational Decisions

5.1 Processive Approach to Operational Decision Taking in a Bank

After discussion, the interrelations between the operational risk measurement and operational decisions quantification it is a need to concern the structure of operational risk and operational management and the adaptation of operational risk analysis to operational decisions. The question how operational risk can be managed in a commercial bank, based on structures, has to be answered.

In general, a clear processive approach in the structure of the course must be developed. This step is an important one because the structure should show the steps in operational risk management. If operational management structure, based on operational risk management, is clearly defined, the decision taker receives clear and precise tasks for execution.

Fulfilling this approach, an operational risk management circle should explain the necessary stages for a processive managing of operational risk. Scheme 23 presents a control loop model of nine key elements to achieve a processive operational risk management. It describes the closed management loop for a general approach to implement operational risk management from beginning to the end.³³⁰ This step is an important one because the logical structure of the loop, presented in layers, should show the clear defined and necessary steps in operational risk management.

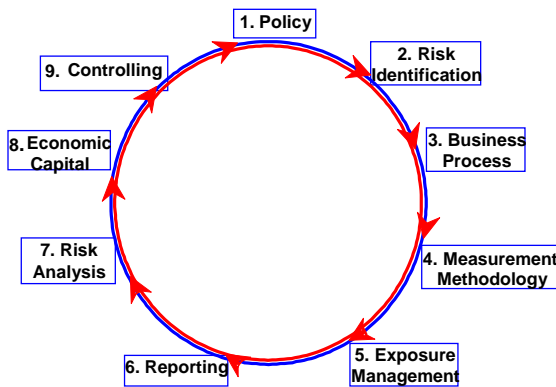
The nine key elements involve setting policy and identifying risk as an outgrowth of having designed a common language, constructing business process maps, building

³³⁰ Wild, J., Grundlagen der Unternehmensplanung, 4th Ed., Westdeutscher Verlag, Opladen, 1982, p. 37.

a practical and goal oriented measurement methodology, based on commercial bank risk-willingness and banking operations, installing a timely reporting capability, performing risk analysis including stress testing, and allocating economic capital as a function of operational risk. At the end is the process of controlling.

The **first step** is an established definition of the operational risk policies. Banks management is demanded to define the risk policy based on corporation's strategy. This includes accurately articulating the desired standards for risk measurement. It is also necessary to create crash barriers as well as guidelines for practices to get a reduction of operational risk.

Scheme 23: Control loop model of nine key elements to achieve a processive operational risk management



Source: Author's concept

Some examples are policies for model problems, trading outside banks' rooms, the process of segregation of duties and competencies during procedures. Without defining risk policies, a consequent managing of operational risk is not possible. The policy is the frame for all departments as well as for the management or the supervisory board. The policy should guide the employee which kind of operational risk the financial institution is willing to enter.

The **second step** is to establish a common sense of risk identification. The operational risk categories

- external,
- people,
- systems,
- process,
- management failures including strategic management risk and
- reputational risk

have to be defined in a common language within every single bank. This is a guarantor that the whole bank company, this includes senior, executive management and the employees as well, will understand the meaning and contents of each category. Examples are as follow: External risks arise by changing laws. People risk is happening if well-educated staff will be allocated to a department where its skills cannot be used. Virus attacks from the outside belong to the system risk. Process risk contains execution errors. Investment decisions, which at the end result into a loss, are strategic management failures. Reputational risk occurs when customers are not satisfied with the provided service or if erroneous transactions happen.

Comparing scheme 18, the **third step** is the business process and means to develop the business process maps of each business. A more detailed categorisation is shown in appendix 7, containing the risk-categorisation approach, which represents: people, enlarged by external, systems, process, management failures including strategic risk and reputational risk. This includes analyzing the products and services that each organisational unit offers and the action, which is needed to take and to manage operational risk. This categorisation is an important tool for identification and assessment of operational risk.

Concerning processes, the area of processes is a subject for a closer look and a further triage³³¹. Reviewing scheme 24, it figures a model of the categorisation of process risk on an example of a classification in A-, B- and C-processes, comparable with a traffic light. C-processes are comparable with a green phase, because there are only 20 % risks during processes and this amount is tenable in comparison with an

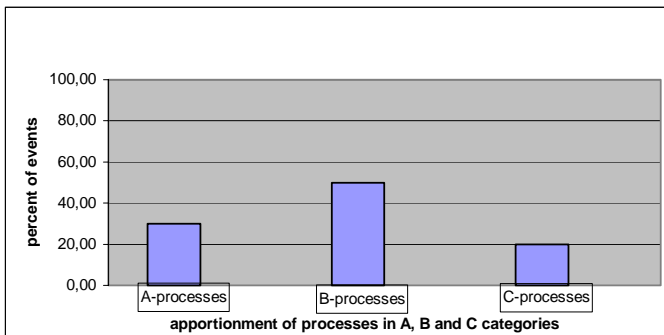
³³¹ Triage means a division under aspects of priority.

economic view. Reducing these parts of processive risk will result in increasing costs without an equal profit. These processes require only a sensitive view of operational risk, because there are no or only barely operational risks seen.

The B-processes are comparable with the yellow traffic sign. There is a need to investigate in activities based on the risk categorisation and a further observation. In the example the events are 50 %. The operational management should closer analyse the relevant processes and the events which caused those failures.

The A-processes are comparable with the red traffic light and will have high impact. In this example these processes, representing 30 % of the events, require an immediate and accurate analysis about the operational risk situation with ad hoc reporting to banks management, as there is a considerable operational risk and a high potential of losses.

Scheme 24: The model of process risk categorisation



Source: Author's concept

Referring the loop, the **fourth step** is management's decision what kind of model and methodology the bank uses to measure operational risk. It belongs to the level of experience in the risk management, to select which kind of model will be the best for an institution. It is not advisable to implement a complex risk measure management, if there is not much individual experience concerning the operational risk management.

With regard to the employee, it also belongs to staff's education what kind of model will be the best for a bank as well as the business and transaction area of the bank. A commercial bank as a global player has other requirements on risk management systems than a commercial bank with a local business area, as stated in former chapters. The loss database was discussed in the former chapters and is indicated as a methodology for soft entrance to operational risk measurement. Table 19 presents current risk measurement methods in financial institutions. A further developed measurement methodology, based on the Value at Risk, will be a possible measurement in future for a wide and broad processive approach. For unique events, the analysis based on the Value at Risk is not goal oriented, because there is rarely a possibility to control and at last, there will be no decision talking by the management, if flood or fire is coming.

Regarding the **fifth step**, it is important to decide how to manage operational risk exposure and take appropriate action to minimise, reduce, avoid or hedge the risk. It is an important management task to define, how much costs will be invested in processing control, segregation of duties or insuring. Concerning operational management investments, it is a management decision how much investment a bank will set to minimise, to eliminate or to shift operational risk.

Table 19: Current risk measurement methods in financial institutions

Main risk areas, in which banks measure its risks	Risk measurement method
Market price risk	Value at Risk, given period of 10 trading days, confidence level 99 percent.
Credit risk	Up to now only estimations based on static methods, in future Value at Risk method will be expected, but given period of 220 days, confidence level 99 percent.
Operational risk	No actual form the supervision in German banking accepted model on market, Value at Risk models in controversial discussion, financial institutions start for collecting data.

Source: Author's concept

In a **sixth step** the reporting system is also an important part of the implementing process of operational risk. The reporting system should be integrated in the prevailing and actual reporting system. Without an integral but individual reporting bank's risk situation will not be represented in the required form. This will be a

diversified problem, because there are a lot of different risk measurement methods in today's bank risk management. The following risk measurement methods are shown in table 19. The model measurement for market and credit risk are currently used and known in commercial banks worldwide. A model measuring the operational risk is still under construction and strong discussed.

Risk analysis is the **seventh step** in the control loop of risk management. This stage concerned the tools for risk analysis, and procedures and where those tools should be deployed. For example, risk analysis is typically performed as a component in launching new products, annual recurrent business reviews, and new consumer laws. Stress testing scenarios should be regarded as a principle in the part of risk analysing. The frequency of risk evaluation should be a measurement function of the degree to which the operational risks are basically expected to change over time as businesses undertake new initiatives, or as business circumstances develop. This frequency might be reviewed as operational risk measurement is rolled out over and across the bank. The measurement and analysis should be a part of a monthly risk report for the management. The process of analysing has to be consequently and continually adapted to the current development of the bank.

In the **eighth step**, an operational risk should be considered under economic capital aspects. In common, there are no defined rates to measure operational risk in dependence on the economic capital.³³² Based on this, it will be difficult to find an adequate rate for this kind of risk.³³³ Certainly, the problem under capital allocation aspects is first the wideness of the operational risk area, second the terminology of expected and unexpected losses, and third the scenario analysis. Especially, the worst-case scenario analysis will bring problems inside the available capital in the bank, because for all operational risks the capital of a bank cannot cover such a stress test, as well as other risk categories needs covering capital, for example market price risk and credit risk. Therefore, there is no practical model for capital allocation concerning operational risk, if extraordinary events occur. This approach of considering economic capital und operational aspects is a new one and partly contained in the operational risk calculation, seen in table 18. In future, this approach should be introduced in calculating bank services covering losses or parts of losses similar to the add-on based credit rating.

³³² Van den Brink, G., *Operational Risk*, Schäffer Poeschel Verlag, Stuttgart, 2001, p. 55.

³³³ Van den Brink, G., *Operational Risk*, Rowe Antony Ltd., Great Britain, 2002, p. 75.

Chapter Six

Modelling of Bank Decisions System Respecting Operational Risk

6.1 Requirements and Elements of Modern Operational Decisions System

As represented in the chapters before, catastrophic losses, as the attack of terrorists on 11th of September 2001³⁷⁹, or natural events, such as flood or fire, are events with a negative influence on financial institutions. Concerning table 5, which figures the most important examples of financial disasters in the international banking sector, such effects of the events could lead to reduce or block bank's operations, or, in the worst case, the insolvency of a bank. Banks should have plans in place for such events like business recovery, business continuity and emergencies. Those events are categories of operational risk, represented as contents of operational risk elements and features in subchapter 2.2. Until now, operational risks have not found much acceptance under the management focus in banking. In recognition, it should be in the focus, as stated in the chapter before.

For an effective operational risk management, a structured working system is necessary. A system is any organised assembly of resources and procedures united and regulated by interactions or interdependence to accomplish a set of specific functions. In this case, it means the aggregate elements, which are interrelated. Each individual bank is an element and therefore it is the possible to build up banking groups out of such elements.³⁸⁰

³⁷⁹ Posny, H., Terroristen verursachen größten Schaden aller Zeiten, Die Welt, Düsseldorf, 31.12.2001. Sky checker have kidnapped two airplanes and demolished the twin towers of the world trade centre in New York with thousands of victims.

³⁸⁰ Grote, M., Change Management: Organisations- und Personalentwicklung in Banken, 1. Edition, Bankakademie, Frankfurt/Main, 2001, p. 117.

Concerning operational risk, the advantage and benefit are in reducing costs of risk, increasing the profit and optimising processes. Referring to the system it has to be standardised and consistent on a bank wide level for identification, recording data for quantification, qualification, controls and measurement, analysing and managing operational risk in financial institutions, based on well-defined requirements by the management. Next to the requirements, the system depends on elements, which are necessary to fulfil its tasks. Therefore, requirements, elements and their features are the fundamental parts for an efficient working operational risk management system.

The requirements for an operational risk management system have to be very detailed. In missing such detailed requests, it is dangerous to perform the daily bank operations based on imprecise or the absence of goals and objectives.

An important requirement to such a system is to fulfil the legal and supervision stipulations. The specific contents for legal and supervision requests are shown in subchapter 1.2 concerning the legal regulations as a frame for a management in banks and subchapter 1.3, which presents the Basel Committee Recommendations for Risk Management in Banking.

An additional important requirement is the open mind of the management and the board of supervisory as well as the second level of the leadership to the subject of operational risk management.³⁸¹ This enlarged group of management has to be convinced for the need of a bank wide operational management. Implementing operational risk in a bank without the positive opinion of the whole management will not reach acceptance overall management levels. At last, it will fail at the end. An important reason, implementing an operational risk management system is also the possibility and a large-scaled chance for an optimised economical view of a commercial bank. The efficiency economic value added based on increasing bank profit and a future effective development and improvement for banking operations.

Based on an external driven of changing risk culture in financial institutions, the identification within the management for implementing this risk category in commercial banking must be very high. The drivers are competition, customer needs and banking

³⁸¹ The term "Board of Supervisory" is used here same as the "Member of the Board". There are significant differences in legislative and regulatory frameworks across countries regarding the functions of the board of directors and senior management. In some countries, the board has the main, if not exclusive, function of supervising the executive body –senior management, general management– so as to ensure that the latter fulfils its tasks. For this reason, in some cases, it is known as a supervisory board. This means that the board has no executive functions. In other countries, the board has a broader competence in that it lays down the general framework for the management of the bank. Owing to these differences, the terms 'board of directors' and 'senior management' are used in this thesis not to identify legal constructs but rather to label two decision-making functions within a bank.

supervision. In recognition of missing management identification, all expenses for investments in operational risk management will result in losses. As a consequence a strong risk management culture is required. For implementing and improving, it should be authorised by the supervisory board as well as by the general management. In context with this demand, the management also has to agree to the importance of segregation of duties within the operational risk management structures and tasks. The segregation supports the operational decisions in minimising risk events, based on structural, organisational and functional segregation.

The definition of operational risk with a clear delimitation to other risks is an essential part. Without an exact and bank wide valid definition, an operational risk measurement and management is impossible. A missing common definition leads to an improper treatment of operational risk inside a bank. As a result, a future operational risk comparison with equal commercial banks, referring to the banking operations, will not be possible. In context with operational risk comparisons, different operational risk events can be observed. Based on the management function, deviations and their reasons should be researched. It supports reducing operational risk losses based on external commercial bank experience.

Referring to the operational risk definition, in commercial banking there are two requests. Subchapter 2.1 gives information about operational risk definitions. First, it should include the future regulatory requirements of the national and international institutions of supervision. Subchapter 5.4 gives information about the Basel Committee proposals respecting operational risk in banking. The message for the management when implementing operational risk management should be, not to build a complex risk model without the requests of the supervisors.

Second, an internal definition of operational risk is necessary. This internal definition should respect the individual situation of the bank, such as its size and sophistication, its nature and complexity of its activities in an economic manner.³⁸²

Both parts of definitions, based on regulators and the common internal in a bank, should be combined together. Otherwise, the methodology of identification, qualitative and quantitative measurement, analysis and management has to be

³⁸² There is a large difference of operational risk between a cooperative bank, which activities are regional and limited and a global playing bank, like the Deutsche Bank AG, which activities are worldwide. Based on this, the focus of operational risk should be respected to the banks activities.

implemented in two different ways. One will be for banking supervision, the other for an internal measurement approach. This will not be efficient. In recognition, regulators requirements and banks demand on an operational risk management model should be combined. Without such a combination, overall understanding of the operational risk management based on two different methods is not clear and leads to high risk of misunderstanding on all levels in a bank. The advantage to combine the two models into such a procedure is that it provides one valid definition.

Clear strategies and clear definitions of responsibilities are other qualifications and requirements of the system. It should be transparent within the organisation and should be consistent with the bank's overall business strategy and appetite for risk as well as naming the responsible person.

Concerning the system, it should deliver only relevant information to the management of the received data. The goal should be, to put out detailed information about risks in bank operations for a better judgement of markets, strategies and business lines.³⁸³

In view of the actual economic banking situation in Germany, one can say that the profit continuously goes down. This is the result as described in subchapter 1.4, which regards the risk management as an essential part of bank's economics. Based on this, the requests on the system are in optimising processes and procedures for reducing losses and therefore increasing the profit.

For a first time implementation of an operational risk management system, a simple system for records, measurements, further analyses and reports for managing operational risk should be used. This implementation strategy provides several advantages. The following three aspects should be under management's focus for creating an successful implementation.

First, there is the aspect of costs. If the handling costs and the costs of procurement and running costs of the system are too high, there is no incentive for bank's management to accept it. Second, if the system is too complex, there will be nobody of the staff to work and care about it. Third, the cost of education for a difficult and complex system will increase to a high amount of money. As a result, the

³⁸³ Working in a bank on different levels and departments, it is author's experience that systems are often imprecise programmed and the relevance of the received data and information are not useful for managing a bank. The experience Roland Eller has observed, based on a discussion with the author on 20.08.2004 in Meitingen. Roland Eller is the one of the head of Roland Eller Consulting, in Germany a well-known consultant in all financial bank affairs.

investment must be in relation to its output and bank's defined requests. Another demand is that the system has to be well suited under the view of processive approach, into banks' structure, the workflows and procedures in the bank. It is an absolute requirement that people are accepting and following written policies, fixed procedures and defined workflows. The system has to work to be used in parallel to the existing operating environment for the efficiency of operational risk results. Additional records in different data systems reduce efficiency and effectiveness of the processes and as well have negative impact to the staff. This has to be pointed out, because for example with a lot of regulations the development in banking interacts with different data record models without an holistic correspondence.

The task of the system is to stabilise quality and increase the profit of a bank by reducing losses and improving processes and procedures as well as by removing interface problems between encroaching business units.

Another request is to ensure, that staff has appropriate expertise and training about the system and its requests. Considering the costs of a required measurement tool, the education in operational risk management and the structure and processes in commercial banking have to be adapted to banking operations. There should be only one operational risk management system applied by client servers to reduce the aforementioned points. This is certainly more economically. Already shown above, this is also a reason for a simpler operational system for a first implementation.

Investigation and definition of the system plays also an important role. An investigation shows the correctness of the system or gaps in using the system. Sometimes, technical failures can be discovered and abolished, during this check. As there is not in every bank the possibility to examine all operations of the system through internal controls or internal audits it is strongly recommended that the implemented system has to have a certain set of plausibility checking to avoid catastrophic system failures.

Other feature of a modern operational decisions system should support practical, flexible, forward-looking and dynamic management modules within the system. Every system has to be used and properly adapted to bank's daily operations. It is not helpful to implement a system, which has not been already proven than in practical applications or still is under development. Through the continuous process improvement activity the initial system can be further improved. It should be processes

step by step in systematic way to optimize the results in the future. This will be necessary to adapt theoretical models into the operational decisions system.

At last, the system should consider the necessity of business recovery and business continuity plans. In case of catastrophic events, the business recovery plan helps to continue bank operations in a short time. A business continuity plan improves the working conditions in case of a technical or system failure. Based on the plan it should be possible to react in a reasonable time to transfer tasks to back up systems or continue with manual operations.

After defining the requirements for the operational decisions system, the elements play a crucial role. Concerning legal and banking regulations, banking supervisory authority and the state, in which the bank operates, are important external elements in a system. Banking supervisory defines the requirement of an operational risk management model. Legal frames define the basis for banking operations in a state.

With regard to the individual commercial bank, there are another elements, which are internal. Such an internal element is an active supervisory board and management oversight. If those are not wishful to the system, there will be no satisfied and successful implementation. It results in ineffective and insufficient interpretation and management of all procedures, measurements, reports and management decisions.

Concerning the internal control, the second level of the management is also an important multiplier to support the operational decisions. Both, the supervisory board and the general management are responsible for establishing a strong internal control culture in which control activities are an essential and integral part of the regular operations of a bank. Those controls are a need to check the operational risk management system on all levels in a bank. Only with such procedure, faulty records can be corrected. As a fundamental, the recorded data must be accurate, otherwise the subsequent procedures are ineffective and without power and lead to a wrong management of operational risk.

With regard to the definition of operational risk in subchapter 2.1, an exact and valid definition of operational risk is an essential element. Without the detailed and high quality definition, the management of operational risk is not possible.

Furthermore, a periodical review through reports, contingency planning and risk limitation are elements of the system. The report should inform the management about the actual operational risk situation and the development in future as a forecast.

An effective internal reporting system, which considers the size and sophistication and the nature and complexity of bank's activities is another element in the system. Consequently, the reporting system has to be involved in the operational risk management system as an element.

Adequate written policies, procedures and limits on bank-wide level are key elements in establishing an effective operational risk management initiative. This includes an internal and bank-wide common risk language. The common language is important for an integral operational risk management system.

An adequate risk management, monitoring and management information system, which works effectively represents the next element. Operational risk management is a part of the holistic risk management in a bank. An integral view of the total bank risk requires a universal risk management report including operational risks management generated by the established risk management system.

The risk manager of operational risk and the responsible staff for operational risk in the business units or departments are the personnel, who have to work daily with the system. This staff plays an important role within the overall system. Without acceptance and wisdom of the people, the best system will not work. The possible ways for motivating the group of people are shown in subchapter 4.3, which contains the social communication in frames of interpretation of operational risk management.

Top-level reviews of the bank's progress towards the stated objectives should show the management the situation of operational risk management in a bank. This includes also the bank-wide integration of the staff in all levels.

All processes and procedures first have to be controlled through the normal workflow and in a second step, by the internal audit department, which applies partial tests. Another task of the internal audit is the system check for plausibility and the generic functional application.

The subchapter 5.2 describes the necessity of medium management staff's involvement in operational risk control, the head of operational risk management as an element in a bank has the task to continue and improve the system or to steer against wrong developments, caused by the system, based on the operational risk competence centre or bank's individual risk management group.

Chapter Seven

Tendencies in Operational Management Practice in Commercial Banks of Germany

7.1 Characteristics of Present Economic Position of Commercial Banking in Germany

In the former subchapters, a fundamental way of a necessary overcoming about the subject of operational risk management and proposals for implementing operational risk management has been shown. For a bank wide operational risk management implementation, it is important to know the present economic position in German commercial banking. In recognition, Germany is one of the high-developed industrial countries with a large scale of foreign trading, which results in international financial transactions. Referring to operational management, Germany's characteristics of the banking structure and applied banking operations have to be researched.

Basically, the tasks of banks in Germany are the same as in other industrial countries. Banks should satisfy the populations' demand of money in a country and support financial transactions on national and international scale. Referring to the theory of money, it is the medium of exchange, people are using to pay for things, such as goods or services, cash or cashless. Under economic view, the demand of money is the stock of assets held as cash, checking accounts, and closely related assets, specifically not generic wealth or income.⁴²⁰

Concerning the functions of money, there are four traditional functions: the medium of exchange, store of value, unit of account and standard of deferred

⁴²⁰ Dornbusch, R., Fischer, S., Startz, R., *Macroeconomics, Eight Edition*, McGraw-Hill Irwin, 2001, p. 354.

payment. The medium of exchange is the classic view.⁴²¹ Store of value, unit of account and standard of deferred payment are the modern theories of money function. John R. Hicks called this the Triad of money.⁴²²

In change of time, in the 1980s money got a widening range of interest bearing-assets, which also had to become checkable.⁴²³ As a result, the definition of money changed. This forced an ongoing review on where to draw the line between assets, which formed part of the basic definition of money and those that are just financial assets and not proper money.⁴²⁴ Under this aspect, banks play an important role under economic view and the structure in the German banking system has to be regarded.

Representing a banking system, the term of system has to be defined. In theory, a system is any organized assembly of resources and procedures united and regulated by interactions or interdependence to accomplish a set of specific functions. In this case, it means the aggregate elements, which are interrelated. Each individual bank is an element and therefore it is the possibility to build up banking groups out of such elements.⁴²⁵

Respecting operational risk management, the fundamental structure of commercial banks in Germany has to be researched. A neglect of this approach, it is hardly possible to achieve a well-suited bank and operational management. The banking operations of commercial banks are different as well as the business policy in every financial institution.

The German banks' system is characterized by a structure which is subdivided into three main components, which are named the **three pillars in the German banking system**, presented in scheme 34. The three pillars consist of private banks, also called big banks, cooperative banks and public credit institutions, which pictured the German Savings Bank Association.⁴²⁶

⁴²¹ Jevons, W. S., Money and the Mechanism of Exchange, C. Kegan Paul & Co., London, 1875.

⁴²² Hicks, J., R., Critical Essays in Monetary Theory, Oxford, 1967.

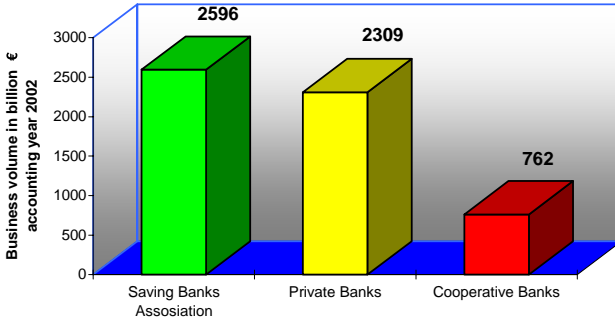
⁴²³ Dornbusch, R., Fischer, S., Startz, R., Makroökonomik, 6. Auflage, Oldenbourg Verlag GmbH, München, 1995, p. 447.

⁴²⁴ Ibidem.

⁴²⁵ Grote, M., Change Management: Organisations- und Personalentwicklung in Banken, 1. Edition, Frankfurt/Main, 2001, p. 217.

⁴²⁶ Genossenschaftsinstitute sind die privatesten von allen Banken, Pressespiegel, Bayerische Landesbank München, 21.03.2002, p. 16.

Scheme 34: Structure of the three pillars in the German banking system



Source: Author's concept, based on the business volume⁴²⁷ of the competitive comparison of German credit institutions, unpublished by the Deutscher Sparkassen- und Giroverband, Berlin, 2003.⁴²⁸

Based on the business volume with regard to scheme 34, the German Savings Bank Association, also known under the term of savings-bank-financial association group, in German called **SB-Finanzgruppe**, is seen to be the largest pillar on the German financial market, followed by the private Banks and as third pillar the cooperative banks.

Scheme 35 presents the research of the share of the German commercial bank market, measured in the volume of business at the end of the year 2003. Regarding to the three pillars, it is seen that the Savings Banks Association has the deepest market anchoring in commercial banking, followed by the cooperative banks, and at last the other commercial banks.

Researching the Monthly Report of the Deutsche Bundesbank, the following situation figures structural data of the German credit institutions:

The Savings bank association has 502 institutions, 15.351 branches and 312.400 employees, and at last, the other commercial banks⁴²⁹

⁴²⁷ Volume of business = Balance sheet total plus endorsement liabilities arising from rediscounted bills, own drawings outstanding, discounted and credited to the borrowers and bills sent for collection prior to maturity from the banks' portfolios. Source: Deutsche Bundesbank, Monthly Report, Frankfurt, December 1991, p. 12.

⁴²⁸ DSGV = Deutscher Sparkassen- und Giroverband, it is the head of the German Savings Bank Association, the data used data of the DSGV are from the Deutschen Bundesbank, Frankfurt, Main.

⁴²⁹ Deutsche Bundesbank, Frankfurt, Monthly Report September 2004, p. 21.

The structural data of German credit institutions, shown in table 26, represents the various categories of all banks in the year 2002 and 2003. It is important to know that the three pillars can be viewed as commercial banks, because they are in mutual competition together with foreign banks.

When analysing the structural data of the German credit institutions, it is obviously seen that the savings banks as public institutions and cooperative banks association have the largest number of institutions, branches and employees. To the public credit institutions count the savings banks, the Landesbanken and the specific banks with the task of special public order and some banks for public credits, like Landesbodenkreditanstalt for loan granted to establish new business enterprises.

An essential role play the savings banks and the Landesbanken, based on their market share and the fact that they are under public administration and are not able to get equity from the market or their owners, which are public owners such as the state, a county or rural district. The savings banks developed over the course of time into the biggest and most significant credit institution-group in Germany.⁴³⁰ The first time the concept of saving was formulated by the Frenchman Hugues Delestre⁴³¹ in the year 1611.⁴³²

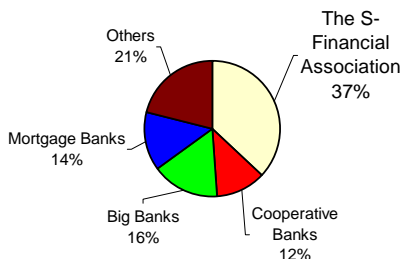
Their owners are rural districts, towns or associations of both. Their operations are concentrated and limited to their region of the owner and therefore called regional principle. Therefore, savings banks customers are in the region of the savings banks owner, the communities. The profits of the savings banks are not given to the public owner. Profit has to increase the capital, because savings banks have no opportunity, like other banks, to get capital from the capital markets. This is the reason why savings banks have to create profit to increase capital, which is necessary for banks' business operations.

⁴³⁰ Sommer, A., *Geistesgeschichte der deutschen Sparkassen*, Deutscher Sparkassenverlag, Stuttgart, 2000, p. 16.

⁴³¹ Mura, J., *Entwicklungslinien der deutschen Sparkassengeschichte*, Deutscher Sparkassenverlag, Stuttgart, 1987, p. 1.

⁴³² Koopmann, J., *Der Einfluss öffentlich-rechtlicher Kreditinstitute auf den Wettbewerb im Bankensektor*, Berlin, 20.02.2001, pp. 3 – 4.

Scheme 35: Share of the German commercial bank market, measured on the volume of business 2003⁴³³



Source: Author's concept, based on the statistical data *Geschäftszahlen 2003*, Deutscher Sparkassen- und Giroverband, Berlin, 2004, p. 10.

Table 26: Structural data of German credit institutions

Performance of the various categories of banks in 2002/2003^P

€ million

Category of banks	Partial operating result ¹		Operating result ²		Profit for the financial year before tax ³		Memo item Balance sheet total ⁴	
	2002	2003 ^P	2002	2003 ^P	2002	2003 ^P	2002	2003 ^P
All categories of banks	31,571	28,836	6,997	17,353	10,920	1,850	7,129,090	7,027,988
Commercial banks	8,847	5,141	3,472	4,793	909	-5,683	2,309,650	2,251,587
Big banks	4,328	266	58	649	-1,931	-7,315	1,601,526	1,533,976
Regional banks and other commercial banks	4,423	4,741	3,357	4,016	2,789	1,506	676,254	689,268
Branches of foreign banks	96	134	57	128	51	126	31,870	28,343
Landesbanken	4,327	5,110	-2,098	2,340	1,302	-2,233	1,644,026	1,639,615
Savings banks	8,996	9,374	2,641	4,615	3,427	4,805	975,490	974,186
Regional institutions of credit cooperatives	582	176	120	130	309	49	213,520	203,899
Credit cooperatives	4,157	4,492	945	2,555	2,517	2,895	548,026	553,146
Mortgage banks	2,293	2,332	593	1,198	1,285	830	929,571	877,381
Special purpose banks	2,369	2,211	1,324	1,722	1,171	1,187	508,807	528,174

¹ Net interest and net commissions received less general administrative spending. — ² Partial operating result plus net profit or net loss on financial operations, net other operating income or charges and net income or net

charges from the valuation of assets (other than financial fixed assets). — ³ Operating result plus net other and extraordinary income or charges. — ⁴ Annual average.

Deutsche Bundesbank

Source: Deutsche Bundesbank, Monthly Report, Frankfurt, September 2004, p. 17.

⁴³³ The total volume of business concerning all commercial banks in Germany at the end of the year 2003: 6,298,185 million Euro. Source: Bizer, R., statistical data *Geschäftszahlen 2003*, Deutscher Sparkassen- und Giroverband, Berlin, 2004, p. 10. Deutscher Sparkassen- und Giroverband.

The public credit institutions, i.e. the savings banks' finance-group, possess the greatest market share with over 489 savings banks acting locally and regionally, 13 federal state banks and other institutions, for example the DGZ-DEKA Bank⁴³⁴ and the number of 312.400 employees.⁴³⁵ The federal state banks do not possess own offices like the savings banks. They are the central banks of the savings banks.

The second pillar builds the private banks. The private banks are located all over Germany and even run branch offices in foreign countries. There are 591 institutions, 10.187 branches and 192.900 employees.⁴³⁶ Regarding their business policy, they are exclusively orientated towards profit making. They have still not reached the function of a market leader, but private or also called, big banks, play an important role in Germany's foreign economics. They enforced a lot of foreign transactions and operations, caused by the German industry. In contrast to the savings banks and the cooperative banks, they have a much higher engagement to invest into stock corporations in order to increase their profits and by that their shares under the aspect of valuation.

The third pillar in the German banking system is the group of cooperative banks. With actual approximately 1.396 institutions, 13.213 branches and 173.650 employees⁴³⁷, it is the bank-group with the largest number of institutions.⁴³⁸ Their operations are similar to the savings banks and also tied to the regional area, in which they are located. The members of a cooperative bank are also people in the same town or commune where the cooperative bank operates. Based on this, their business area is limited by their owners. Their business thoughts and strategies are comparable with those of the savings banks. For specific operations, they have central institutions as well. The advantage compared to savings banks is that a cooperative can place new cooperative shares, when they need additional capital.

The cooperative shareholders are usually not strongly interested to achieve maximum profit, because they are often part of the customer clients. For example, to

⁴³⁴ The DGZ/DEKA Bank is a central institution of the German Savings Banks Group. Incorporated under public law, the bank has its headquarters in Frankfurt and, for historical reasons, Berlin, but no domestic branch network. Including subsidiaries, the bank operates with a total staff of 2.899, state 31. December 2000. Source: Deutscher Sparkassen und Giroverband.

⁴³⁵ Deutsche Bundesbank, Frankfurt, Monthly Report September 2004, p. 21.

⁴³⁶ Deutsche Bundesbank, Frankfurt, Monthly Report September 2004, p. 21.

⁴³⁷ Ibidem.

⁴³⁸ Lebert, R., Deutsche Banken sprechen sich Mut zu, Financial Times Deutschland, Frankfurt, 15.01.2003.

Summary

The research work done on the modelling and measurement methods of operational risk in banking indicates the challenge of risk management in banking. It demonstrates the need of considering operational risk as a significant management discipline in risk management in banking. Operational risk decisions should play an important role in the process of a holistic risk management in banking. Regarding the various advantages in banking, it should be implemented and improved continuously.

Operational risk covers two dimensions with regard to the economic side. **One is the macro environment dimension.** Operational risk – if it occurs – may have strong impacts and effects to the entire national and international banking system. In recognition it might affect the worldwide economy. Considering the presented examples of operational risk events in the past, it confirms the importance.

A weak bank management and in parallel a weak risk management are indicators for increasing financial risks. The events enlarge through the entire financial system of a country or countries with extensive economic consequences. With regard to this, national and international laws, rules and regulations are demanded requirements.

The second is the microenvironment dimension. It involves each single financial institution with economic effects on all levels. Regarding to bank's operational management, the research expresses exactly that bank management takes the full responsibility for the bank. It is the main task of bank's management to solve the question of a holistic risk management involving operational risk management.

This work was concentrated on the fundamental problems in operational risk management with respect to possible facets and concerning the overlap of other risks. It determines the essential tasks required to define and implement its risk categories. According to the risk categories, they should be included into a holistic bank risk management. For this purpose, a valid definition and delimitation to other important bank risks has been created. It based on theoretical and empirical risk analysis.

Appendix

Appendix 1 to chapter 1.2

Legal regulations as a frame for a management in banks

»(1) Credit institutions are enterprises which conduct banking business commercially or on a scale which requires a commercially organised business undertaking. Banking business comprises

- 1 the acceptance of funds from others as deposits or of other repayable funds from the public unless the claim to repayment is securitised in the form of bearer or order debt certificates, irrespective of whether or not interest is paid (deposit business),
- 2 the granting of money loans and acceptance credits (lending business),
- 3 the purchase of bills of exchange and cheques (discount business),
- 4 the purchase and sale of financial instruments in the credit institution's own name for the account of others (principal broking services),
- 5 the safe custody and administration of securities for the account of others (safe custody business),
- 6 the business specified in section 1 of the Act on Investment Companies (Gesetz über Kapitalanlagegesellschaften) (investment fund business),
- 7 the incurrance of the obligation to acquire claims in respect of loans prior to their maturity,
- 8 the assumption of guarantees and other warranties on behalf of others (guarantee business),
- 9 the execution of cashless payment and clearing operations (giro business),
- 10 the purchase of financial instruments at the credit institution's own risk for placing in the market or the assumption of equivalent guarantees (underwriting business),
- 11 the issuance of prepaid cards for payment purposes, unless the card issuer is also the service provider and hence the recipient of the payment made using the card (prepaid card business), and

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List of Schemes

<i>Scheme 1:</i>	Basic relation between increasing profit and risk	10
<i>Scheme 2:</i>	The main pillars of the New Basel Capital Accord.....	36
<i>Scheme 3:</i>	Total result of the yearly asset valuation in selected German commercial banks	42
<i>Scheme 4:</i>	Operating results after valuation of assets	44
<i>Scheme 5:</i>	Important categories of banking risks.....	45
<i>Scheme 6:</i>	The dimensions of liquidity risk	47
<i>Scheme 7:</i>	Formal definition of operational risk.....	52
<i>Scheme 8:</i>	Example for a capital risk loss distribution for a given operational risk subcategory	70
<i>Scheme 9:</i>	Banks' profit for the financial year after tax in the German banking sector	79
<i>Scheme 10:</i>	Operational risk and the overlap of other risks	80
<i>Scheme 11:</i>	Typical structure in a commercial bank division I a	84
<i>Scheme 12:</i>	Typical Structure in a commercial bank division I b.....	84
<i>Scheme 13:</i>	Typical structure in a commercial bank division II	86
<i>Scheme 14:</i>	Typical structure in a commercial bank division III	87
<i>Scheme 15:</i>	The generic value chain	92
<i>Scheme 16:</i>	The value added chain	94
<i>Scheme 17:</i>	The total process model in commercial banking	96
<i>Scheme 18:</i>	Process flow procedure of a customers opening an account	99
<i>Scheme 19:</i>	Procedure of a process flow of securities trading for commercial banks own account	100
<i>Scheme 20:</i>	Analysis of credit events.....	129
<i>Scheme 21:</i>	Proposal of a project management structure within a commercial bank	135
<i>Scheme 22:</i>	Decision matrix for an operational risk management report	143
<i>Scheme 23:</i>	Control loop model of nine key elements to achieve a processive operational risk management.....	147
<i>Scheme 24:</i>	The model of process risk categorisation	149
<i>Scheme 25:</i>	Structure of operational risk management in commercial banking.....	155
<i>Scheme 26:</i>	Development of the profit before depreciation and the staff costs in the German banking system.....	162
<i>Scheme 27:</i>	Relation matrix of operational risk between the level of technology and the number of staff	162
<i>Scheme 28:</i>	Operational loss events and staff education under the influence of costs	164
<i>Scheme 29:</i>	Increasing of operational risk by selected risk events	186
<i>Scheme 30:</i>	Effects of low streams of information.....	188
<i>Scheme 31:</i>	Effects of optimal streams information	188
<i>Scheme 32:</i>	Monitoring the process flow on example of the credit business	197
<i>Scheme 33:</i>	Dependency of commercial bank activities and operational management	207

<i>Scheme 34:</i> Structure of the three pillars in the German banking system.....	211
<i>Scheme 35:</i> Share of the German commercial bank market, measured on the volume of business 2003.....	213
<i>Scheme 36:</i> Development of the cost income ratio of the three German banking pillars.....	220
<i>Scheme 37:</i> The influence of bank supply and customer demand affecting commercial banks' profit.....	226
<i>Scheme 38:</i> Three-step-approach of Risk Management in commercial banking.....	232
<i>Scheme 39:</i> Horizontal and vertical risk measurement cube.....	233
<i>Scheme 40:</i> Environmental analysis in commercial banking for finding drivers and obstacles in operational management.....	239
<i>Scheme 41:</i> Intensity of rivalry in banking.....	245

List of Tables

<i>Table 1:</i>	Comparison of definitions of risk in business	8
<i>Table 2:</i>	Definitions of risk management in banking.....	12
<i>Table 3:</i>	Reviewing legal banking and business regulations in Germany.....	21
<i>Table 4:</i>	When commercial banks start to act on a critical credit, all in percent ..	27
<i>Table 5:</i>	The examples of most important financial disasters in the banking sector affecting world economics.....	41
<i>Table 6:</i>	Collection of definitions of operational risk	53
<i>Table 7:</i>	Collection of definitions of operational risk in bibliography	54
<i>Table 8:</i>	Matrix analysis of operational risk definitions based on selected organisations, banks and bibliography.....	55
<i>Table 9:</i>	Internal and external operational risk elements and features	63
<i>Table 10:</i>	Collection of top-down and bottom-up risk model types and their conceptual features.....	68
<i>Table 11:</i>	Model collection of individual operational risk measurement methods	73
<i>Table 12:</i>	The business line approach of primary and supporting activities in commercial banking.....	88
<i>Table 13:</i>	Procedures covering operational management in commercial banking.....	99
<i>Table 14:</i>	Selection of commercial banking related and unrelated procedures	102
<i>Table 15:</i>	Selection of typical human risk elements in commercial banks.....	108
<i>Table 16:</i>	Selection of detailed operational risk event type-categories.....	117
<i>Table 17:</i>	Example of a limit escalation trigger measurement approach for operational risk.....	128
<i>Table 18:</i>	Calculation variable retail-customer credit on a charge account	144
<i>Table 19:</i>	Current risk measurement methods in financial institutions	150
<i>Table 20:</i>	Analysis of the relationship staff cost to total administrative spending.....	160
<i>Table 21:</i>	Basel Committee's proposal for managing operational risk concerning business lines in commercial banking.....	171
<i>Table 22:</i>	Comparison of the methods of the Basel Committee's advanced measurement approaches.....	172
<i>Table 23:</i>	Requirements and elements of a modern operational risk management in a commercial bank.....	182
<i>Table 24:</i>	The process profile work sheet	190
<i>Table 25:</i>	Comparison of prudential and economic elements concerning financial reports in commercial banking	202
<i>Table 26:</i>	Structural data of German credit institutions	213
<i>Table 27:</i>	Calculating the development of the cost / income ratio of the three banking groups in Germany	219
<i>Table 28:</i>	Net income or net charges from the valuation of assets of German credit institutions.....	220
<i>Table 29:</i>	Analysis of comparing commercial banking competition concerning the German three pillar approach in banking	223

<i>Table 30:</i>	Market influence on the operational management	228
<i>Table 31:</i>	Proposal of a risk management report, based on a limit system under a holistic bank management	237
<i>Table 32:</i>	Evolution of risk management reporting in banking.....	246

List of Formulas

<i>Formula 1:</i> Aggregate risk formula in banking.....	11
<i>Formula 2:</i> Risk weighted assets.....	38
<i>Formula 3:</i> LogNormal Distribution.....	71
<i>Formula 4:</i> Inventory	104
<i>Formula 5:</i> Optimum level of education.....	164
<i>Formula 6:</i> Basic Indicator Approach	168
<i>Formula 7:</i> Alpha factor	168
<i>Formula 8:</i> Standardised Approach,.....	170
<i>Formula 9:</i> Operational productivity.....	216
<i>Formula 10:</i> Cost income ratio I	216
<i>Formula 11:</i> Cost income ratio II	216
<i>Formula 12:</i> Cost income-ratio III	217
<i>Formula 13:</i> The addition matrix concerning risk measurement in commercial banking	234



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