

# Risk Intelligence through DWH and Business Intelligence

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**Abstract:** Risk Intelligence draws from a comprehensive portfolio of advanced risk and compliance capabilities to provide a single point of control for effectively governing critical enterprise risk and compliance activities. Risk Intelligence means a broader view of risk, managing both exposures and opportunities to find an optimal balance of risk and reward. Through Risk Intelligence, a company can : Manage potential exposures and comply with regulatory measures; Align and balance risks and rewards with organizational goals; Seize opportunities that support both tactical and strategic objectives. Risk intelligence can provide a comprehensive risk management architecture that offers a 360 degree view of the organization's risk and compliance activities and a single point of control for governing them.

It helps building an integrated view for : risk based management, market risk, credit risk, operational risk, anti-money laundering, fraud detection and fraud management.

**Keywords:** risk intelligence, risk management, risk governance, credit risk, operational risk, market risk, fraud management, business intelligence, datawarehouses

## I. INTRODUCTION

Risk is the possibility of an event to happen. It is generally associated with damage and loss. In every day life we associate risk with an unpleasant event. It is necessary to consider to recap the views of risk within a multi-step process:

- Hazard – the risk of an event to happen
- Danger of risk catalyst that allows the risk to occur
- Impact of the event upon the company
- Risk management – the process in which someone can limit or avoid the potential damage.

The most significant risk types are:

- Reputation risk
- Market risk
- Credit risk
- Operational risk

Market risk, credit risk and operational risk are also outlined in the latest Basel II banking regulations.

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## II. BUSINESS INTELLIGENCE FOR RISK MANAGEMENT

All companies take risks every day. Business intelligence is used to assess the risk and mitigate it. Risk management can be used in all parts of a business, from financial planning to product development to sales and customer service. In all cases, business intelligence provides a more complete picture and highlights sources of risks and alternative avenues. Business managers can then make better-informed decisions when deciding on a course of action.

Risk management also involves setting up exit plans and deciding on exit levels - at what stage the company should back out of the project without suffering too much loss. It is important to assess the risks; identify ways to lower or eliminate the risks and to define a comprehensive exit strategy.

### **Risk Management, Business Intelligence Help Execs Walk the Tightrope**

Risk Management measures and provides data in terms of exposure or opportunity for business performance.

Business Intelligence and risk management are linked on two levels. First, when used in conjunction they provide executive level transparency into risks within the organization, and secondly, they can provide a risk-adjusted performance review. For example, when an organization is putting together a strategic plan (i.e. a product launch or new corporate direction) it is critical that the organization has a clear understanding of the risks it may run into, and consequently provide a risk-adjusted performance review. This is where BI is crucial, as it provides data, analysis and reporting—the high level of information needed—to make insightful and accurate business decisions. Through the use of Risk Management and BI practices, overall business performance is improved.

Executive transparency and risk adjusted performance review are tightly linked. However, executive transparency tends to be more of a proactive, operational daily approach at the executive level. This involves understanding how the business is operating, what are the risks, and how the company is performing with respect to mitigating these risks. Risk-adjusted performance reviews occur on more of a project basis, where corporate direction is analyzed to deeply understand the possibility of risk, and consequently adjust plans and forecasts accordingly.

### **How Risk Management and BI Work Together**

Risk management cannot effectively function without BI. The BI infrastructure within an organization is needed to collect and analyze data on a highly detailed level which is then input into risk-related decisions. BI also is needed to allow executive level decision-makers the ability to look across all categories of risk (in different business units, categories, geographies etc.), providing a more global view into business performance, and where certain risk-related issues need to be addressed.

## **III. RISK ASSESSMENT WITH BUSINESS INTELLIGENCE**

A detailed statistical analysis of business data will often reveal relationships between data sets. Understanding the degree of influence various factors have on the business outcome is fundamental to accurate risk assessment. The non-scientific part of risk-assessment lies in the inability to foresee future risks.

Business intelligence is used to identify possible sources and the degree of risk by gauging the degree of influence various factors have on the business. The future risks can not be pinpointed, but we use business intelligence to highlight as many risks as possible that could arise as a result of various changes in influencing factors, and by painting a number of scenarios where things could go wrong.

## **IV. RISK MITIGATION**

Once the risks have been identified, it is relatively easy to mitigate them. Our risk mitigation services will use business intelligence techniques to paint possible ways around a problem and model the results. This process is complicated and varies with the type of business and level of risks being faced.

- Data mining techniques
- Business intelligence application
- Data cleansing

### **4.1. Data Mining Techniques**

The core of a business intelligence process lies in data mining with multi-point analysis. Multiple data points are compared with each other, over time and with external influencing factors to highlight behaviors and trends in the data. In this stage the numbers are crunched to find out everything we possibly can about your customers.

Typically a project is approached with a few pre-defined questions in mind that need to be answered and is followed-up by an open-ended analysis that investigates relationships between various elements, influencing factors and trends. Customers can use specific market research services to understand how external factors influence their business.

#### **4.1.1. Data mining with predefined points of analysis**

Data mining with predefined points of analysis is aimed at understanding customer behaviors by analyzing relationships between various pre-decided influencing factors. The results of such an analysis will answer questions relating to the interaction

of a set of influencing factors. For example, a predefined analysis of customer service versus sales would illustrate the effects of good and bad customer service on sales, and would answer questions such as how important customer service is to your customers and how much it influences future sales.

#### **4.1.2. Data mining with open-ended analysis**

The objective of data mining with open-ended analysis is to discover trends that are not anticipated by ordinary immersion in the day-to-day business.

Open-ended analysis is important because it is not biased by the knowledge and expectations of individuals working in the industry but is guided by findings from prior analysis of predefined points and the experience of an external, unbiased agency.

#### **4.1.3. Results of data mining**

At the end of the multi-point analysis, the results of the business intelligence project can be delivered, with explanation of their meaning. Based on the findings, recommendations can be done for operational changes and also marketing requirements.

### **4.2. Application of business intelligence**

The following paragraphs describe very simple examples of the application of business intelligence (BI) to various parts of your business. The examples provided here are very simplistic, and are used only for explanatory purposes. Real life scenarios will rarely be as straightforward ...implying an even greater need for BI.

Using BI to analyse campaign effectiveness

The effectiveness of a marketing campaign should be tested within a week of the campaign start / finish and then 3 months or even 6 months after the campaign ends. BI is used to determine campaign effectiveness in terms of cost per lead, lead conversion ratio, total campaign ROI, post-campaign sales changes and net campaign effectiveness / ROI. Cost per lead = Total campaign cost / Total new leads

Lead conversion = Total new sales / Total new leads

Total campaign ROI = Total new revenue / Total campaign cost

Sales change = % change in sales from average after campaign / % change in sales from average during campaign

Net campaign ROI = Net change in sales over 3 months / Total campaign cost

#### **Strengthening BI**

Here are some tips on leveraging risk management practices to provide stronger and more introspective BI analysis:

- Identify and eliminate risk factors and exposure points within the organization to create a strong foundation/base.
- Examine opportunities related to taking strategic risks within the business (new products, launches into new geographies/industries, M&A, etc.).
- Assess the potential risk exposures tied to moving forward with strategic company direction and initiatives.

- Apply this risk management analysis to your overall business intelligence framework to provide executive management/management board with a clear view of not just the company's risk exposure (and where risks have been eliminated altogether) but where there is an opportunity to take strategic risks with the added layer of business intelligence needed to make smarter business decisions.

#### **4.3.Data Cleansing**

All data relating to customers should be stored in an organized format and data from multiple customer touch points should ideally be accessible from a single, easy to use interface. This, however, is hardly ever the case.

Most companies use multiple databases to store customer information relating to different customer touch points. A common example of this is companies that use some sort of CRM software to manage all sales contacts and a separate incident-management type of software to handle customer support queries. Such a set up might seem to be the logical choice initially, because it keeps the two departments' functions separate.

However, sales persons rarely talk to customer support personnel about their selling activities and as a result might end up calling a customer trying to sell them something just minutes after the customer might have logged an angry support call!

Multiple data sources, poorly maintained customer information and incorrect data entry can collectively cost a company thousands of pounds in lost business.

In order to avoid this, there are data cleansing services, that :

- cleanse customer databases
- verify customer data accuracy
- eliminate duplicated and incorrect entries
- interlink or consolidate multiple data sources enabling easy access to customer data for your marketing, sales, support teams and all other personnel who interact directly with customers.

## **5. RISK DRIVEN PERFORMANCE IN A FINANCIAL COMPANY**

### **5.1. Optimize capital and risk**

Risk Intelligence means a broader view, enabling to balance risk and reward across credit, market, operational, compliance and fraud disciplines.

The heart of a Risk Intelligence Center consists of robust, integrated, analytic applications that empower investment choices and asset allocation with the following consequences:

- Free up capital
- Increase earnings
- Lower funding costs
- Maximize shareholder value

### **5.2. Increase visibility, foresight and agility**

The upper management can be frustrated when they are cut off guard by an issue they should have seen before. Executives expect risk practitioners to evaluate all possible scenarios for potential hazards and opportunities, so they can adapt and respond to issues, as they arrive. Risk Intelligence provide an early warning system that gives a 360-degrees view of the organization, allowing to:

- Identify, measure and report exposures early on ;
- Prioritize exposures for the most appropriate action
- Make the right decision at the right time

### **5.3. Gain an integrated view**

While every situation is different, the architecture and the models should be able to reconcile the different definitions of users and map them into common terms understood by all. This can be achieved using structured modeling, data mapping and metadata to :

- Preserve uniqueness at a granular level while enabling translations into terms that everyone understands
- Ensure transparent, consistent, auditable information across the enterprise

### **5.4. Build a risk-aware business process**

Effective risk management should be a part of every aspect of the business, so that all the activities and initiatives should consider all the potential risks and consequences that can appear. By using Risk Intelligence for managing risk and compliance activities, the company can :

- Calculate and report risk information using consistent definitions and consistent metrics
- Distribute the right information , to the right people, at the right time , in the right format
- Make risk management an integral part of the business process

### **5.5. Achieve a robust data management and analytic environment**

This requires an extensive transformation to improve data quality before applying risk analytics.

## **VI. ARCHITECTURE FOR RISK MANAGEMENT**

This architecture provides a comprehensive risk management, offering a 360-degrees view of the organization risk and compliance activities, and a single point of control for governing them. This Risk Intelligence Architecture integrates capabilities from five functional areas: market, credit and operational risk, as well as compliance and fraud, providing a consistent, transparent and auditable risk management system.

Risk Intelligence integrates capabilities from credit risk, market risk, operational risk, compliance and fraud, enabling the company to ensure a bottom line with a consistent, transparent and auditable risk management system.

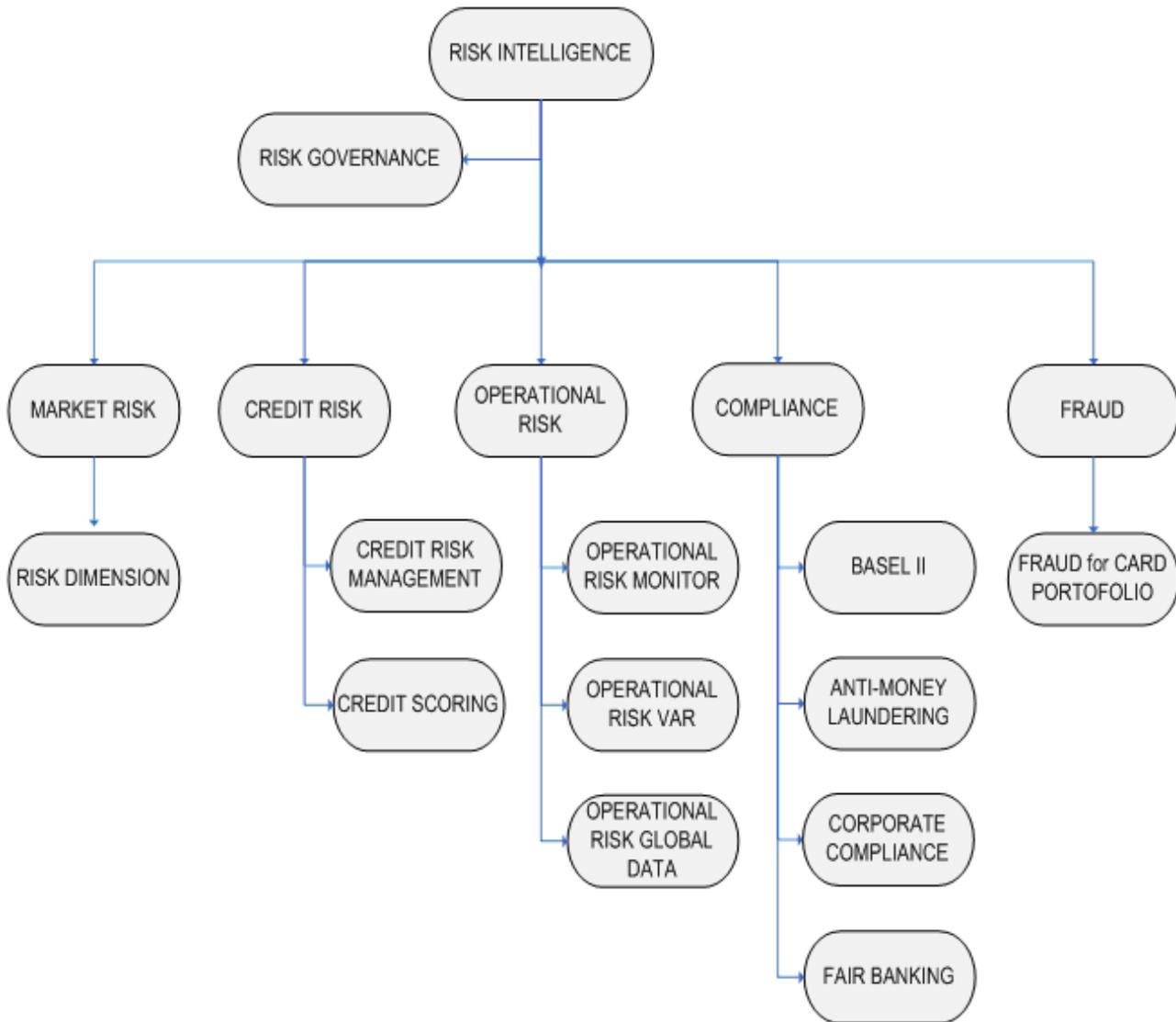


Fig. 1. Architecture for Risk Management

### 6.1. Risk-based performance management

Corporate governance provides the structure through which company objectives are set and determines how these objectives will be achieved and how the performance will be monitored. Because financial institutions often actively seek out risk in the form of opportunities, the concept of corporate governance is essential.

A risk-based performance management solution should :

- Gather data from every source, transforms it into the information you need to make better strategic decisions and then communicates them throughout the organization.
- Promotes an enterprise-level environment for aggregating, managing and optimizing disparate risk exposures and key risk indicators in an integrated risk profile

- Facilitates the exchange of information with other business solutions across the organization
- Helps endusers, that everyone is working toward the same profile

### 6.2. Market risk

Today , it is important to consolidate information from across the organization, combine multiple instrumenttypes into one portofolio, perform scenario and stress tests, calculating at-risk measures and deliver customized reporting to users.

The data management capabilities let you :

- Access and consolidate market and position data from numerous sources regardless of location, platform or system
- Analyze and explore data on multiple dimensions

- Compute accurate, insight-full risk measures and deliver them to decision makers in the preferred format

### 6.3. Credit risk

Financial entities must constantly balance risks and rewards. If they put a too high price on loan products, they lose their customers. If they put a too low price, they starve the profit margin or go to loss. When every department, every line of business and region measures and reports risk differently, it can be difficult to accurately gauge exposure and get the right balance.

A Risk Management system should be an end-to-end application, integrating data aggregation, analytics and reporting within a single, transparent framework, allowing :

- To measure current and potential credit risk exposure accurately
- evaluate alternative strategies for reducing, shifting or transferring risk to ensure that adequate capital reserves are maintained and appropriate capital changes are assessed
- comply with the Basel II accord
- gain a complete view of the company credit risk position, extending beyond the regulatory requirements

### 6.4. Credit Scoring for Banking

Incorporate data management, analytic and reporting capabilities into an in-house credit scoring solution that lets you:

- Develop, validate, deploy and track credit scorecards faster, cheaper and more flexibly than any outsourcing alternative
- Perform application and behavioral scoring to assess and control risk within consumer portfolios and to improve acquisition strategy
- Gain a better understanding of the risk characteristics and attributes that leads to delinquency, default and bad debt

### 6.5. Operational risk

Doing business is risky, but managing the risk shouldn't be. Operational risk can be statistically modeled. For that , the company has to identify, aggregate, evaluate and report operational risks to help mitigate and and control these risks, calculate capital reserves and comply with regulatory requirements.

- Monitoring operational risk - Collect, manage, track and report information about operational loss events, key risk indicators, risk assessment maps and control assessment scores
- Value at risk model allows to splice, dice, drill-down, adjust, trend and plot operational loss data
- Global database for operational risk contains external loss data

### 6.6. Compliance. Basel II

Getting an enterprisewide view of risk and meeting Basel II requirements can require much time, effort and resources. The risk intelligence solution should help to:

- Satisfy the requirements of all the three pillars of Basel II, while calculating and aggregating market, credit and operational risk measures
- Improve capital allocation and optimize the risk-reward profile
- Grow in its own place, using a phased implementation approach, with minimal impact on resources

### 6.7. Anti-Money Laundering

This part should allow the company to comply with national and international regulations and protect the business' reputation by identifying and investigating criminal financial activities

### 6.8. Fair banking

Fair lending legislation in some countries, as US, led to this concept. Fair banking helps the company to :

- Gain a comprehensive understanding of customers and lending activities
- Fully grasp the lending track record and compliance risk exposures
- Know the potential for extending goals to meet better the market needs
- Execute compliance programs for all customers reliably and fairly
- Set priorities and enhance risk control

### 6.9. Fraud detection

Every business is vulnerable to check fraud and credit card fraud, specially the banks, where the 'invisibility' of electronic monetary transactions makes fraudulent activity easier to hide.

Based on an integrated data mart, the solution for risk intelligence should :

- Monitor transactions for suspicious behaviour
- Manage potential fraud cases from detection to notification of the authorities
- Offer real-time scoring of accounts, by looking at all card transactions – including purchases, payments and nonmonetary transactions
- Enable detection and prevention of crime across all the fraudulent techniques

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