

Information Systems and their Role for the Financial Risk Management Process in Dynamic Markets

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*e*financelab

at the HOUSE OF FINANCE

Deutschland
Land der Ideen



Ausgewählter Ort 2011

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Micro-level regulation instead of holistic market consideration

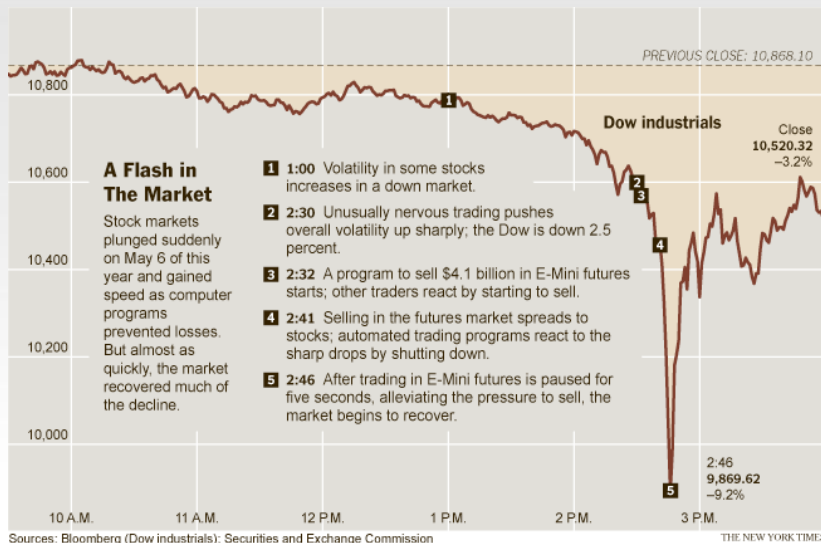
- The focus of regulators was on microprudential regulation that involves ensuring that no individual bank takes large risks
- This failed to prevent a financial crisis because it ignored systemic risk

Sources of Systemic Risk in the Financial Service Sector

1. Panics - banking crises due to multiple equilibria
2. Banking crises due to asset price falls
3. Contagion
4. Currency mismatches in the banking system

[Franklin Allen 2011, Wharton School]





May 6th 2010 Flash Crash

- the biggest one-day point decline (998.5 points) in the history of the Dow Jones Industrial Average
- For a few minutes, \$1 trillion in market value vanished

June 1st 2010 Algo Going Wild!

- Deutsche Bank in Japan sent sell orders worth \$182 million to OSE
- Nikkei 225 Futures index: oss 110 points (+1%)
- Mistake was caught after 0.3% had executed



Contagion with the Speed of Light



- Speed of Light: 299,792,458 m/s
- It takes an order 5.8 ms (0.0058 seconds) to travel from London to Frankfurt one way.
- This is fast – The blink of an eye takes 300ms
- With a single blink of your eye, an order could travel 26 round trips from London to Frankfurt.



Relative to HFT it is slow – HFT trading round trip is at 1ms total. Trading Frankfurt out of London can make you about 10 times slower than your co-located competitor.

[FTEN 2011]



- **Credit Risk**
 - Real-time control and enforcement of credit limits and leverage
 - Netting across trading strategies, asset classes, markets, platforms, etc.
 - Credit allocation and collateral management
 - **Liquidation Risk**
 - Portfolio concentration and balance limits, etc.
 - **Prevention of Fat Finger Errors**
 - Order level checks, price collar, spamming detection
 - **Regulatory and Market Compliance**
 - MAR compliance, shorting limitations, volatility checks, restricted stocks, market surveillance, ...
- **Risk Management is more tied to activities rather than assets, across firm concern, and more operational and technology focused**

[Valerie Bannert-Thurner, FTEN 2011]

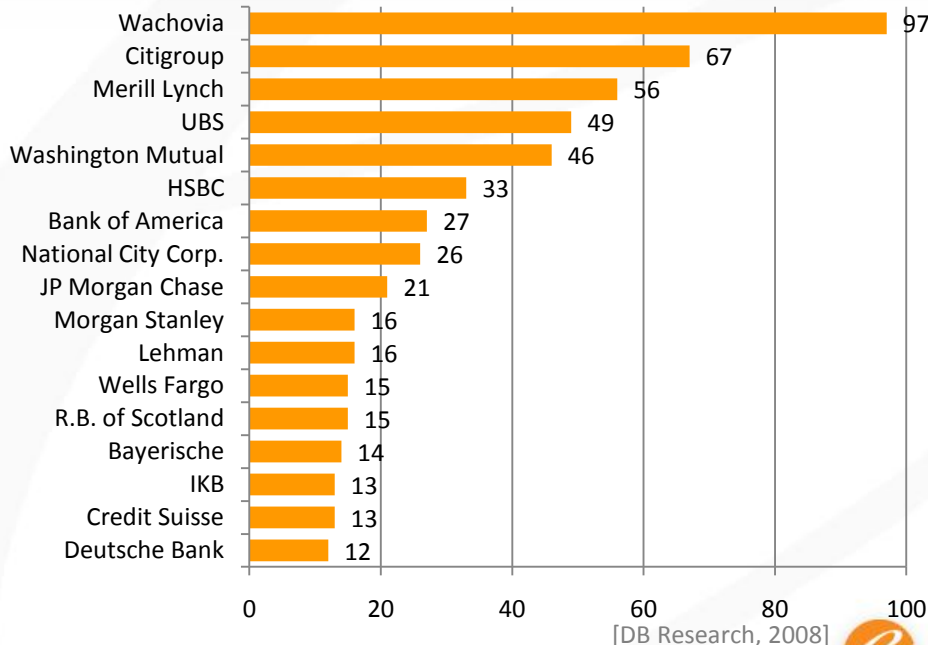


Importance of Risk Management for the Financial Services Industry

- *“The crisis exposed the inadequacy of the risk-management systems of many financial institutions.”*
[Ben Bernanke, Chairman Federal Reserve, May 2009]
- **Inadequate risk management** caused huge amounts of write-offs in the banking industry during the financial crisis and finally lead to a large number of bankruptcies

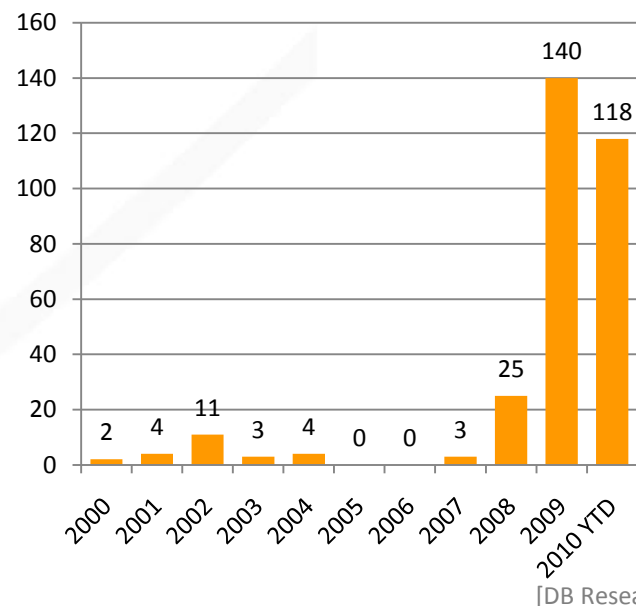
Write-offs in the banking industry

Billion USD



Failing Banks

Number of failed banks as reported by FDIC



Risk Management today:

- Often not in real-time
- Department-specific
- Silo'ed architecture
- Decoupled from trading
- Based on brittle legacy technology
- Financial reference data quality is critical
- Etc.



The questions is:

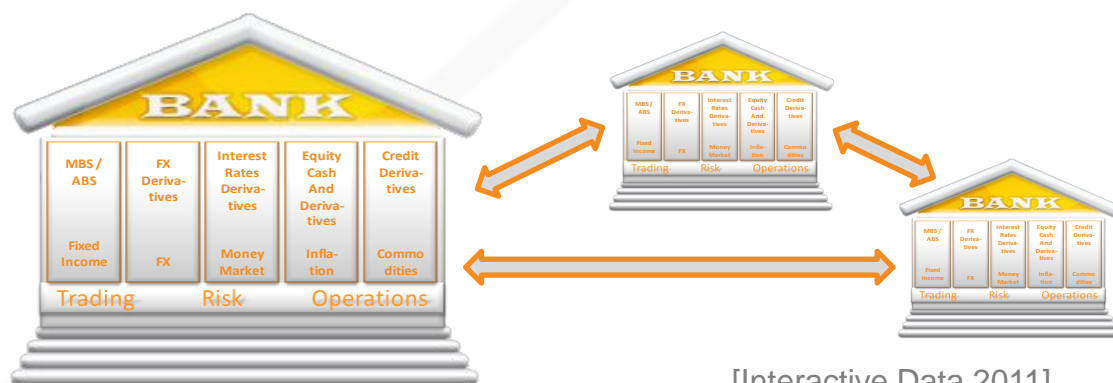
Can IT Lean Against the Wind? Lessons From the Global Financial Crisis

Beck, R. (2010), in: Communications of the ACM (53:5), pp. 38-40

Role of IT and Financial Risk Management: Example #1: Financial Reference Data

- Financial reference data is created by the issuer of a security and enriched by many partners in a downstream process
- Transfer of data is in the majority of cases an import/export technology in proprietary formats, also including multiple data collection points for one (same) data item
- More and more instruments are “created” intraday while reference data processing is done batch-oriented and at the end-of-day only
- Storage requirements are very high, especially since every party in the downstream process stores the full data set again.

**Overall:
High costs,
slow processing speeds,
high redundancy,
high error ratio**



[Interactive Data 2011]



- Reference data for securities is not “sexy”. Investors focus more on real-time price updates and performance
 - But: Reference data is the heart of any transaction, any evaluation is indispensable for any advice.
 - And: While ultra-low latency is almost “standard” today, the creation state of technology and distribution of master data is at a 80’s technology.
-
- **A huge universe:** More than 7 million instruments worldwide (and growing fast).
 - **A very diverse universe:** Each asset class (equities, funds, bonds, etc.) has its own unique set of data fields.
 - **From small to big:** Most investors know the name and identifier of a security. But some securities require more than 100 unique data fields, each with its own dimension
 - **A multi-million cost:** Creating and processing of master data is a costly exercise worth a multi-million USD spend – growing year by year.

[Interactive Data 2011]



Role of IT and Financial Risk Management: Example #1: Financial Reference Data

Financial services provider



e.g., Deutsche Bank

Stock exchange operator



e.g., Deutsche Börse

Regulation authorities



e.g., BaFin, Buba

Financial data provider



e.g., Interactive Data

Financial Service Cloud

Frankfurt Cloud

Hybrid
compute
capacity

Load balancing



Scalability
Compute capacity



Data Cloud

Data pool
"Wisdom of the Crowd"



Application Cloud

Financial Risk
Management




"Best of
Breed"

Diversity due to
Standardization



Role of IT and Financial Risk Management: Example #2: Real-Time Processing

- The **financial services industry** increasingly requests the use of Grid-based IT solutions for their intensive computing demand, especially their risk management applications [Hackenbroch and Henneberger 2007]
- Grid computing enables **heterogeneous and geographically dispersed IT resources** (storage, databases, application servers) to be virtually **shared** and **accessed** across an enterprise, industry, or workgroup [Foster and Kesselman 1999]
- The annual **IT spending in the financial services industry is twice as high** (8% of total revenues) as in other industries [Zhu et al. 2004]



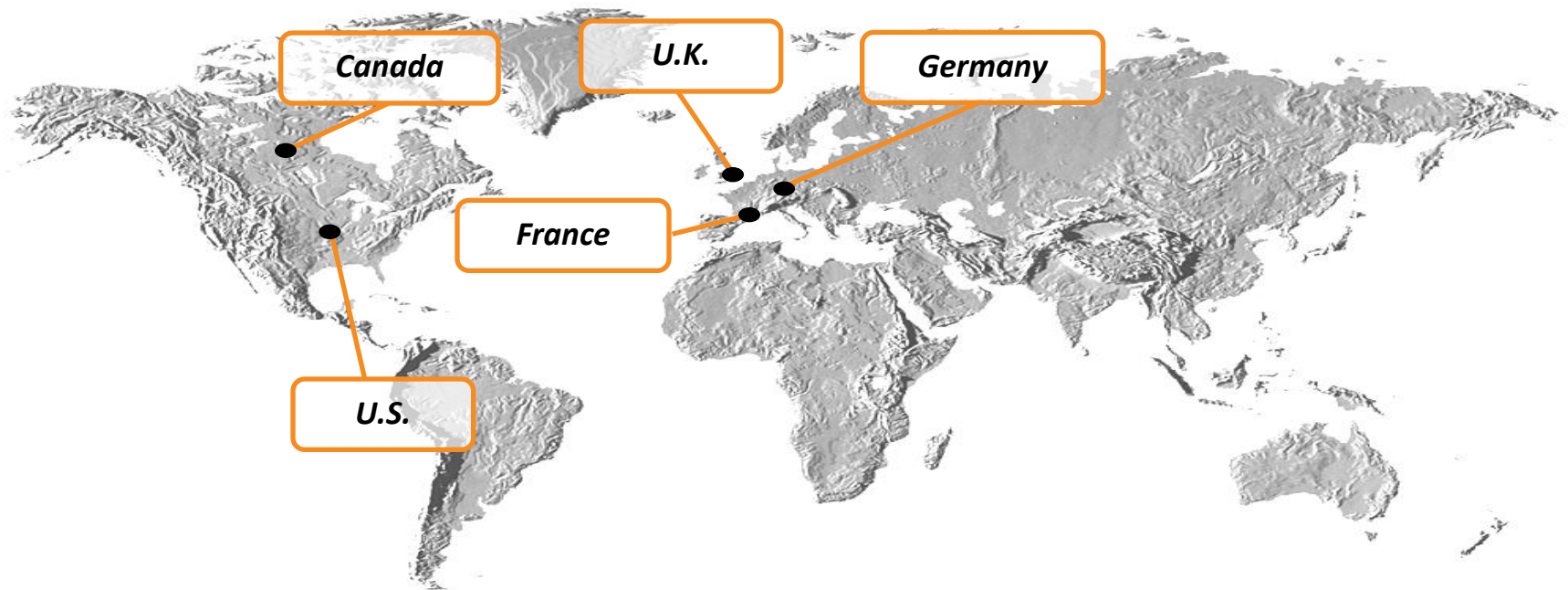
“If you have a look at other investment banks, some of them have a Grid with 10,000 CPUs and thus are in a totally different [competitive] position, e.g. Goldman Sachs. And of course, due to the fact that this is technologically feasible, in this environment, we are talking about [financial] products that exhibit and require such a complexity.”

[Interview Excerpt, Senior IT Project Manager]



Role of IT and Financial Risk Management: Example #2: Real-Time Processing

- **Questionnaire-based field study** was conducted between **August 3rd** and **September 4th, 2009**
- **Respondents' profile:**
 - IT decision maker in a financial institution with 1,000+ employees
 - Grid adopter
 - Disclosure of company name



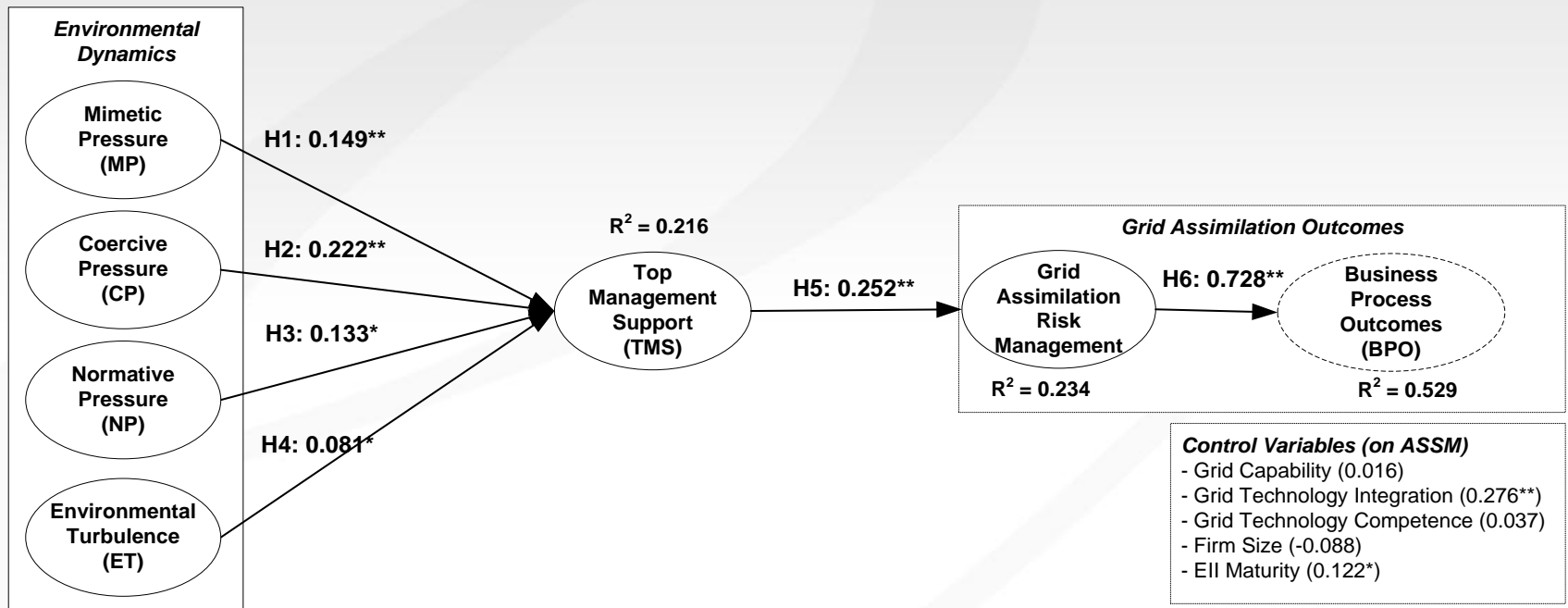
Role of IT and Financial Risk Management: Example #2: Real-Time Processing

- **2,034** potential participants were **invited** and **189** complete responses returned (**final response rate of 9.3%**)
- Responses from **non-Grid adopters**, firms with **1,000 or less employees** and responses that exhibited **missing values** were excluded

Country:		Number of employees (firm size):	
U.S.	189	1,001 - 5,000	28 (14.8%)
		5,001 - 10,000	27 (14.3%)
		10,001 - 50,000	50 (26.5%)
		50,000+	84 (44.4%)
Respondent's position:		Year of first Grid adoption:	
CTO COO CIO	30 (15.9%)	< 2000	12 (6.3%)
Chief Systems Architect	11 (5.8%)	2000-2001	8 (4.2%)
Other Senior IT decision maker	148 (78.3%)	2002-2003	6 (3.2%)
		2004-2005	23 (12.2%)
		2006-2007	57 (30.2%)
		2008-2009	83 (43.9%)

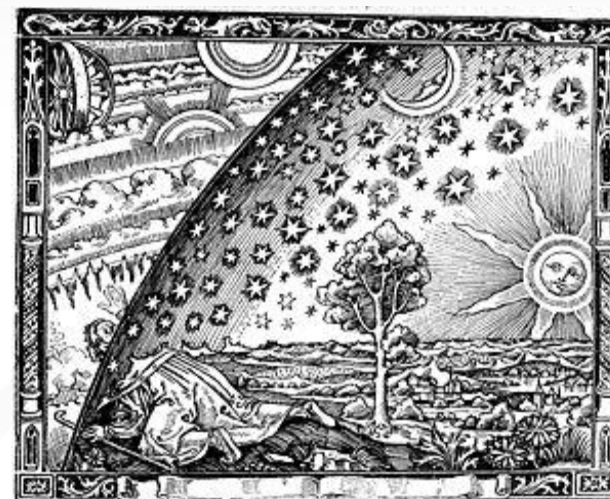


Role of IT and Financial Risk Management: Example #2: Real-Time Processing



1. **The World is not flat but spiky!**
 - While commodity services will be sourced globally, specialist, knowledge-intensive and sensitive services have to be sourced locally
2. **The competitiveness of the future is defined by the access and ability to use IT services!**
 - To improve the vertical and horizontal services supply chain
 - To create a liquid market place
 - To access information
3. **Specialists in financial services with access to information and IT resources will develop the services and products of tomorrow!**

[Mithas and Whitaker 2007]



Un missionnaire du moyen âge raconte qu'il avait trouvé le point où le ciel et la Terre se touchent...

Thank you for your attention!

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