

Moody's Analytics Webinar: New Generation of Credit Decisioning

Next Generation Capability

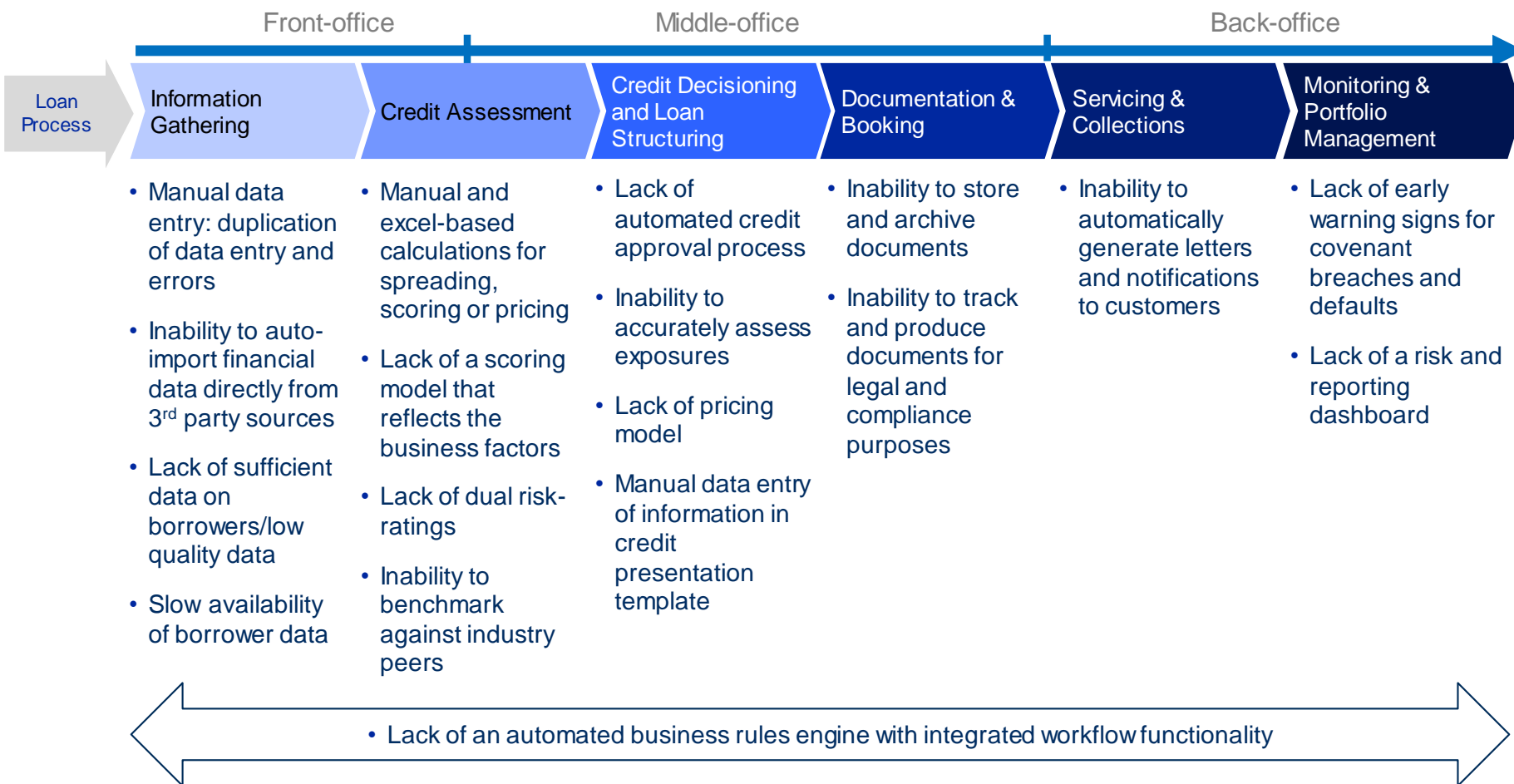
22 May 2018

Agenda

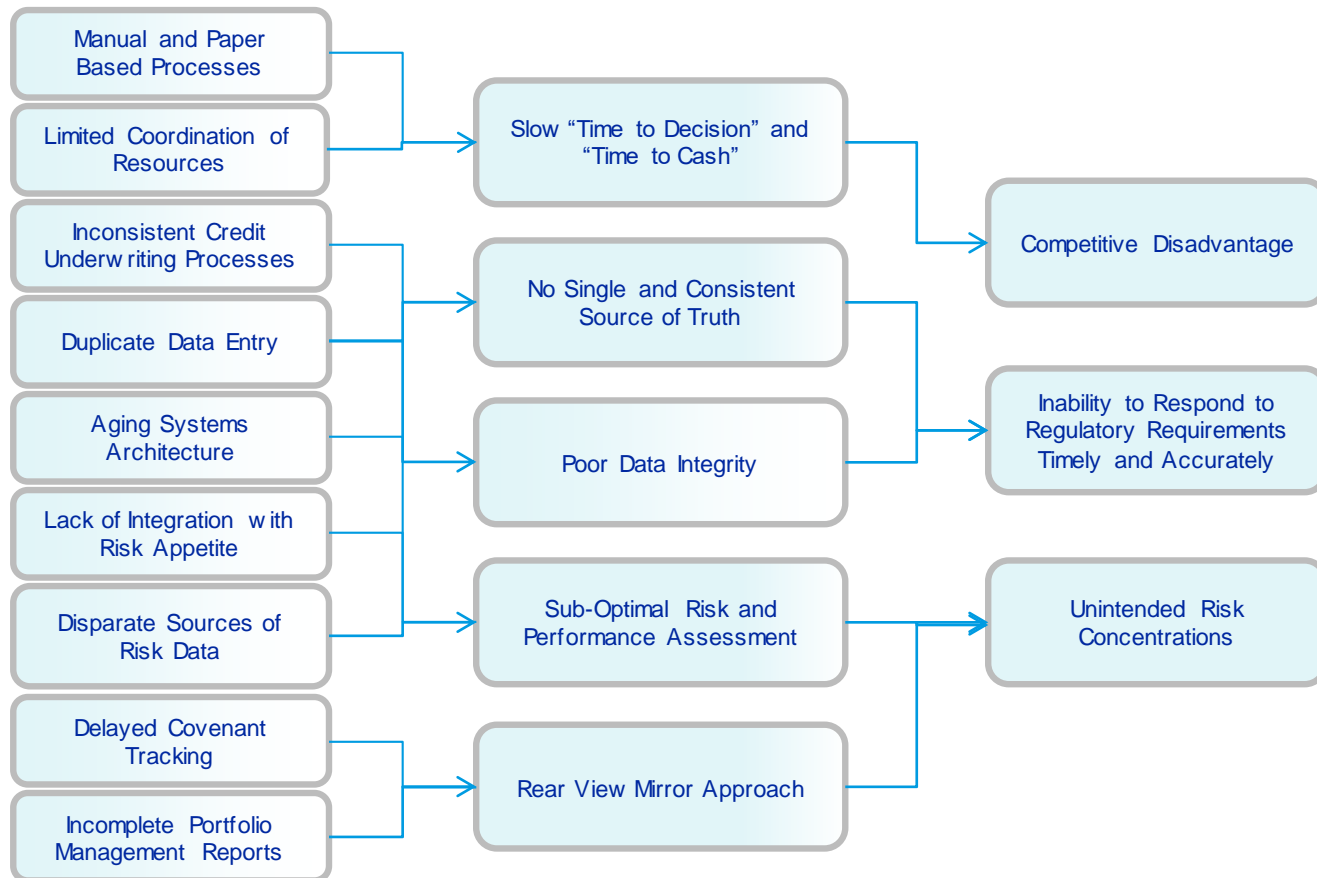
Nelson Almeida – CreditLens™

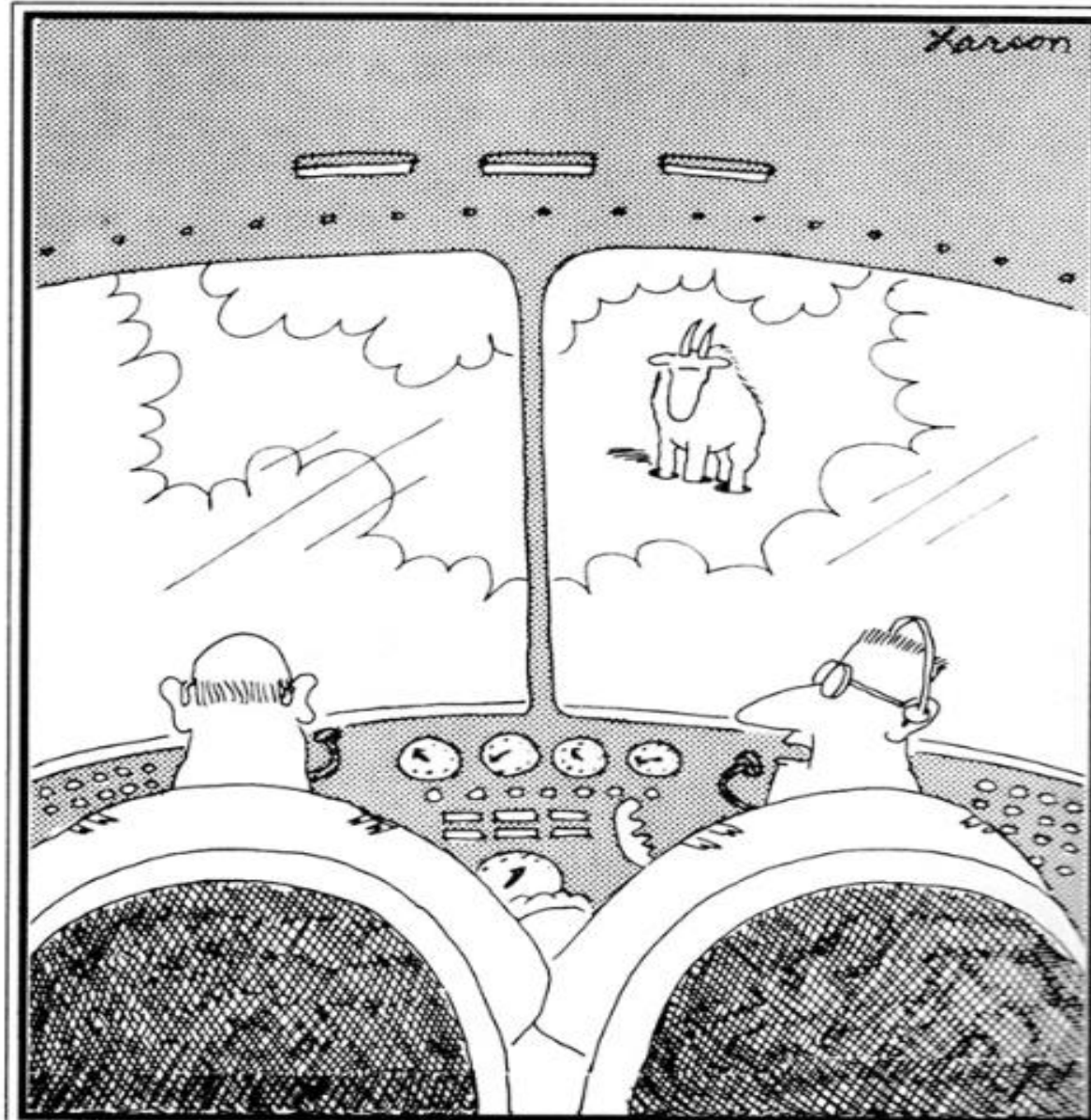
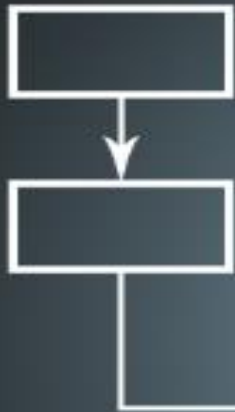
**Jamie Stark – Alternative Data in Credit
Scoring and Decisioning**

Pain Points Cited by Banks in Lending



The Challenges with Legacy Systems and Processes





"Say . . . What's a mountain goat doing way up here in a cloud bank?"



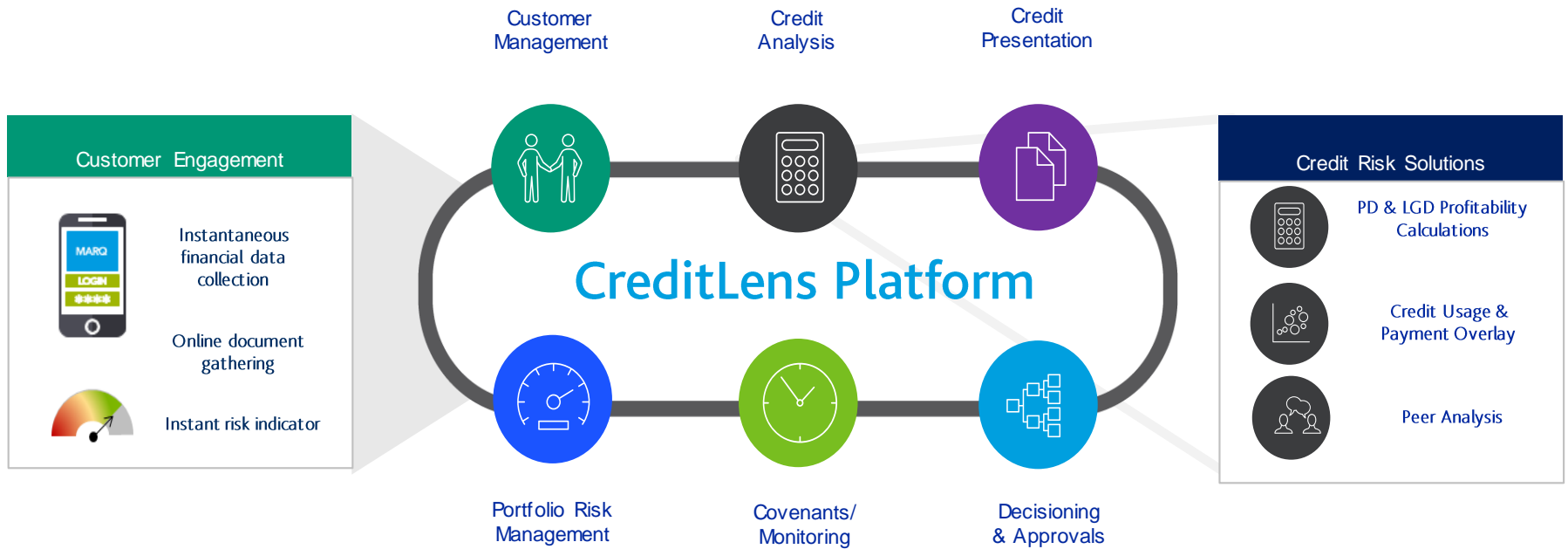
The Future of Business Lending



2

Meeting the Challenge

The CreditLens™ Vision



COLLECT ~ PRE-SCORE

DECISION ~ MANAGE

ANALYZE ~ BENCHMARK

- A frictionless environment
- Consistent control of risk
- Seamless automation & integration
- Leverage new technology

Example: Illustrated Financial Spreading Savings*



80%

Time Reduction



7,500

Hours saved p.a.



225k-

375k

Equivalent cost saving

*Based on 50 weeks, 25 RM's each taking 2.5 hours to re-enter 5 years of financial statements in support of c3 reviews per week. Costs based on \$30-50 per hour. Time per case drops from 2.5 hrs to 0.5 hrs.

Golden Source of Risk Data

Maintain a single, auditable golden source repository of credit and risk-related data with workflow enablement to apply simple business rules, such as automated rating model selection and mandatory data capture

RiskOrigins®

- Configuration
- Administration
- Alerts
- Entity Search
- Entity Management
- Entity Information
- Entity Alerts
- Financial Analysis
- Risk Grading

Entity Information

Configuration: Sharp Edge Products LLC

Administration: Manage Information | Manage Hierarchy

Alerts: Basic Details | Business | Reorganization History

Financial Analysis

Customer Details: Analysis Setup | Historical | User Defined Analysis | Reports

Entity Type: [Dropdown]

Alias*: [Text]

CRM System ID: [Text]

Tax ID: [Text]

Country of Incorporation: [Text]

Date of Incorporation: [Text]

On List: [Text]

Description: [Text]

7 Statements	12-31-2014	03-31-2015	06-30-2015	09-30-2015	12-31-2015	12-31-2015	12-31-2015
Periods	12	3					
Audit Mthd	Unqualifd	Unqualifd	Unqualifd				
Accountant *	PwC	PwC	PwC				
Analyst							
Stmnt Type	Annual	Quarterly	Quarterly				
Accounting Standard							
Status	Approved	Approved	Approved				
Reconcile To	NONE	12-31-2014 - 12 (A03-31-2015 -					
Difference		-					
Current Assets							
Cash	225	45					
Marketable Securities	500	100					
Accts/Notes Rec-Trade	2,569	1,139					
Loans to Related Co - CP	289	123					
Accts/Notes Rec-Other	0	0					
Income Tax Receivable	0	0					
Finished Goods	3,700	1,988					
Operating Current Assets	590	235					
Non-Op Current Assets	1,500	1,100					
Non-Current Assets							
Buildings & Improvements	1,546	1,379					
Machinery & Equipment	250	59					
Leasehold Improvements	550	120					
Accum Deprec & Impairment(435	39					
Total Fixed Assets - Net	1,911	1,519					

Risk Grading


Entity Name: Sharp Edge Products LLC

Entity Name	Proposed Rating-Model Scale	Proposed PD-Model Scale
Sharp Edge Products LLC	A3	0.20%

Rating History | Internal Rating | External Rating

Final Proposed Rating

Cascade Rating To Other Entities



Rating from: [Dropdown] Model Calculated

Model Calculated: A3 PD: 0.20%

Set Entity as Defaulted

Rating Scenarios

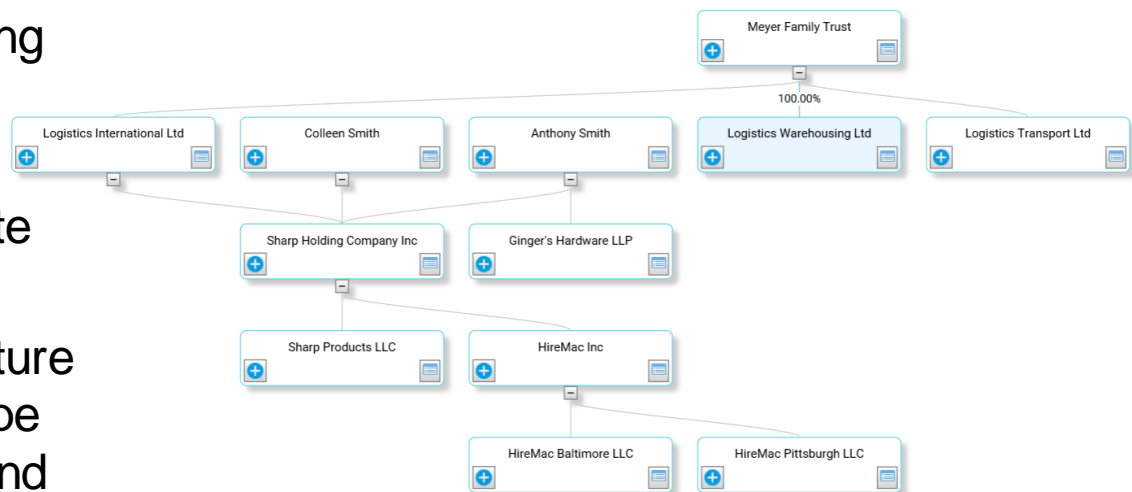
Select	Scenario Information
<input type="checkbox"/>	Annual Review
<input type="checkbox"/>	Base Scenario

Cascade Rating To Current Entity

With Deeper Insight and Control of the Entire Relationship

Entity Management

- » Dedicated entity management module provides core building block
- » Construct relationship structures pivotal to accurate risk assessment
- » Tune and validate data capture in accordance with entity type – improving data strength and quality
- » Control and distribute risk grades within a relationship



Provides a consistent and complete view for risk assessment

Analytics

Powerful financial analysis and risk grading developed over 30 years

- » Probability of Default and Loss Given Default measures
- » Industry standard and custom ratio analysis
- » Multiple accounting templates available to support regional and industry specific accounting standards
- » Integration with our +35 industry and regional specific market leading RiskCalc models, which leverage the largest global database of private company financial information
- » Integration with internal, regulator approved models, or statistical platforms such as 'R'.



Deal Structuring Screens

Facilities

Product Summary Proposal: Credit Proposal - Restructuring Proposal | Task: Deal Structuring | | admin |

Logistics International Ltd

Display Currency

Entity	Currency		Rating	Total Aggregated Limit	Total Utilization	Utilization Level
Logistics International ...	GBP British Pound	Proposed Position	-	5,000,000.00	4,000,000.00	80.00%
		Approved Position	-	5,000,000.00	4,000,000.00	80.00%
		Variation		0.00	0.00	0.00%

Facility / Product

Collateral

Collateral **Guarantee**

<input type="checkbox"/>	Collateral ID	Collateral Type	Collateral Name	Valuatio...	Market Value	Discounted Value	Approved Discounted ...	Variation	Approva
<input type="checkbox"/>	2	General Charge	Fixed and floating deb...	GBP Britis...	25,000,000.00	5,000,000.00	5,000,000.00	0.00	

Guarantees

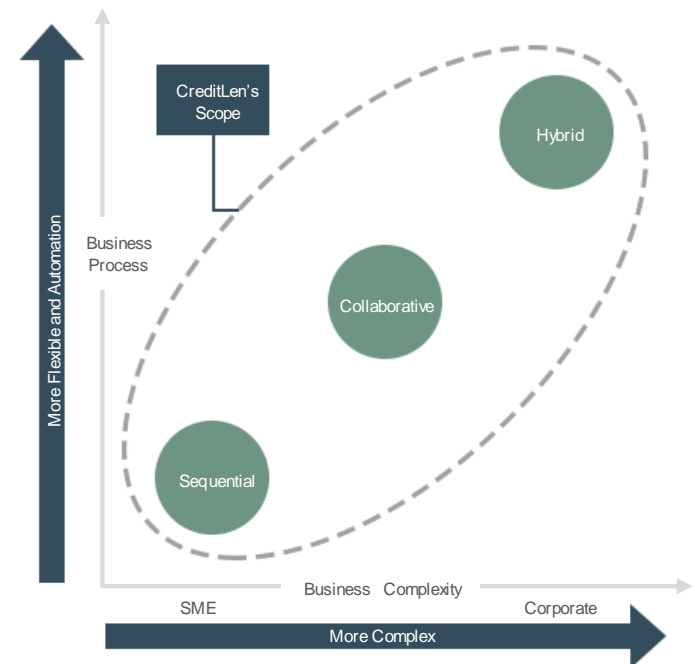
Collateral **Guarantee**

<input type="checkbox"/>	Guarantee ID	Guarantee Type	Currency	Guarantee Amount	Approved Guarantee Amount	3rd Party Guarantee?	Approval
<input type="checkbox"/>	2	Corporate Guarantee	GBP British Pound	0.00	0.00	No	

Flexible Routing Patterns – to meet most business needs

Resolve scenarios of different complexity

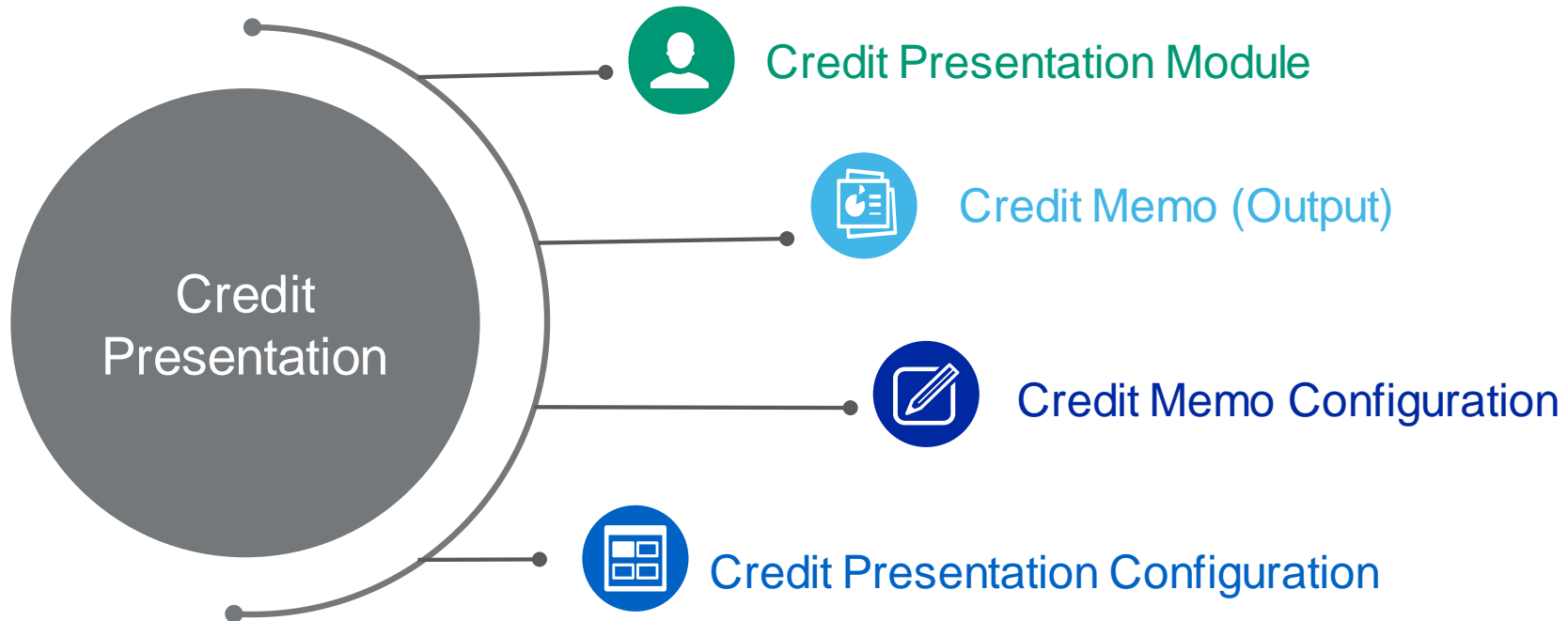
- » Highly predictable and repeatable business scenarios
 - Relatively small scale customer
 - Limited number of business departments
 - Repeatable business activities
- » Unpredictable and unrepeatable business scenarios
 - Large scale customer
 - A number of business departments
 - Complex business activities without a standardized pattern
- » Hybrid business scenarios



Credit Presentation and Memo

Capturing the data and presenting in the Bank's format

Credit Presentation & Credit Memo



Credit Presentation and Memo

Consolidate and inform

Group Facility Summary

Primary Borrower	Product Type	ID	Trx Type	CCY	Proposed Limit	Approved Limit	Exposure	Class	Maturity Profile	Maturity Date	LGD	Rating	Status
6 - Berkshire Hathaway LLC		2	New	USD US Dollar	1,000,000.00	500,000.00	400,000.00	Class 1	12 Months	03/12/2019	-	-	Pending Approval

Primary Borrower 6 - Berkshire Hathaway LLC

Transaction Type New

The analysis of this company uses the 2017 data for all of the companies in the industry code 335122, Commercial, industrial, and institutional electric lighting fixture manufacturing, for comparative purposes. The peer group consists of 94 companies.

Please note that comparing the borrower's interim financial figures to annual industry figures would result in inaccurate assessments. To avoid this inconsistency, all financial ratios that are based on a combination of balance sheet and income statement items are annualized. This could produce misleading results for borrowers with high seasonality in their sales cycle. Please be aware of this potential problem as you analyze this case.

OPERATING PERFORMANCE

NET SALES GROWTH: Net Sales increased moderately, changing by 4.99%. Net Sales were 4,362 in the 6-month period ending 6/30/2017, compared to 8,309 for the 12-month period ending 12/31/2016. The two-year average Net Sales Growth was 2.37%.

PROFITABILITY

GROSS MARGIN: The Gross Margin percentage increased moderately from 12/31/2016 to 6/30/2017. Gross Profit was 1,343 for the 6-month period ending 6/30/2017, resulting in a Gross Margin percentage of 30.79%. In the 12-month period ending 12/31/2016, Gross Profit was 2,496, resulting in a Gross Margin percentage of 30.04%.

The Gross Margin percentage was below the industry average of 41.1%.

OPERATING EXPENSES: The Operating Expenses to Net Sales percentage increased moderately to 26.18% in the 6-month period ending 6/30/2017 compared to 24.85% in the 12-month period ending 12/31/2016.

This percentage is better than the industry average of 35.0%.

For analysis, consider these questions and issues:

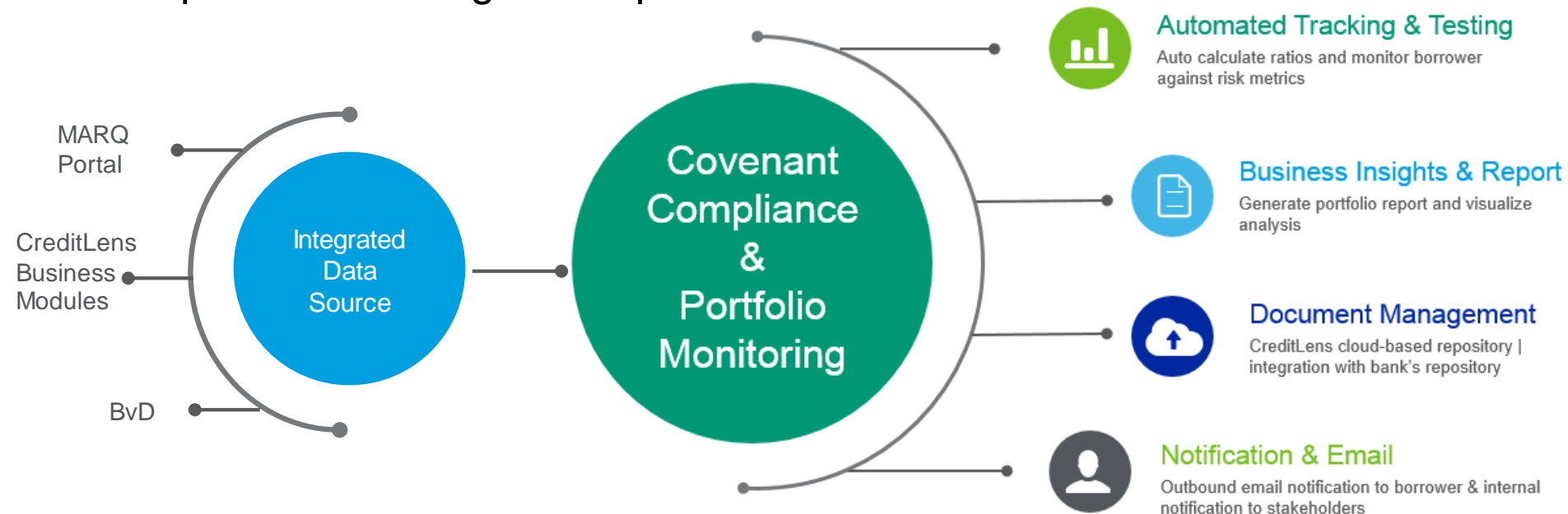
Control of overhead appears to be slipping as the Operating Expenses to Net Sales percentage increased moderately. In spite of the deterioration, this ratio compares favorably with the industry average. You should determine the reasons for the increase in operating expenses and the likelihood that the increase will continue. Consider the ability of management to maintain this ratio in the face of rising costs or a declining sales level.

OPERATING PROFIT MARGIN: The Operating Profit Margin decreased moderately from the 12-month period ending 12/31/2016 to the 6-month period ending 6/30/2017, decreasing by 0.58 percentage points. Operating Profit was 201 in the 6-month period ending 6/30/2017, resulting in an Operating Profit Margin of 4.61%. In 12/31/2016 the Operating Profit was 431 resulting in an Operating Profit Margin of 5.19%.

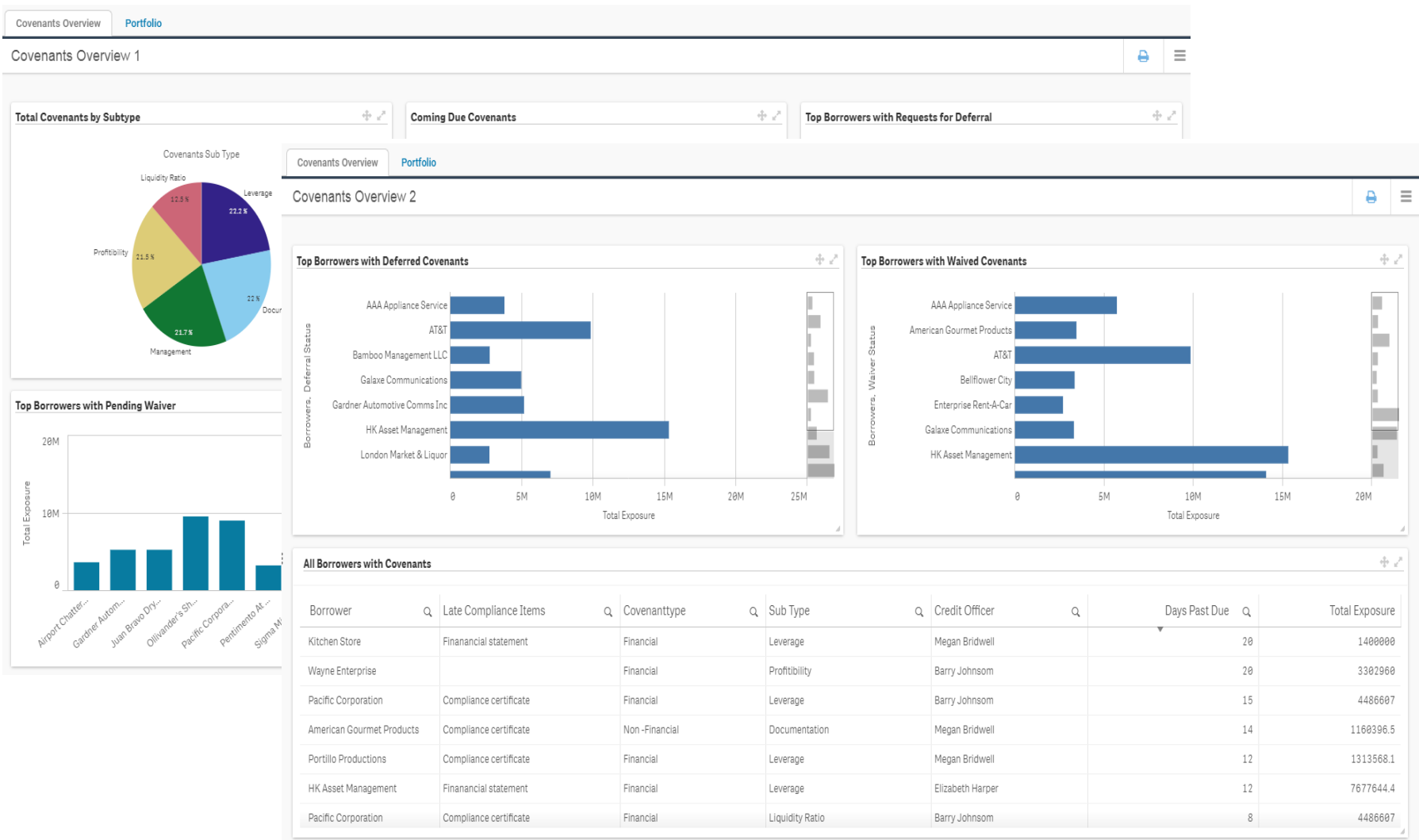
The Operating Profit Margin was below the industry average of 6.1%.

CreditLens Covenants Meets the Markets Needs

- » Automate compliance checking
- » Monitor early-warning indicators
- » Improve credit origination practices



Covenants Overview



Tracking & Testing

An overall view of statuses of all active covenants

CreditLens™ Tracking & Testing Wen Ren

Configuration Administration Alerts Proposal Documents Reports Entity Search Entity Management Financial Analysis Risk Grading LGD Risk Analysis Asset Search Deal Structuring Covenants & Conditions Tracking & Testing Credit Presentation

My Queue Group Queue

> Filter

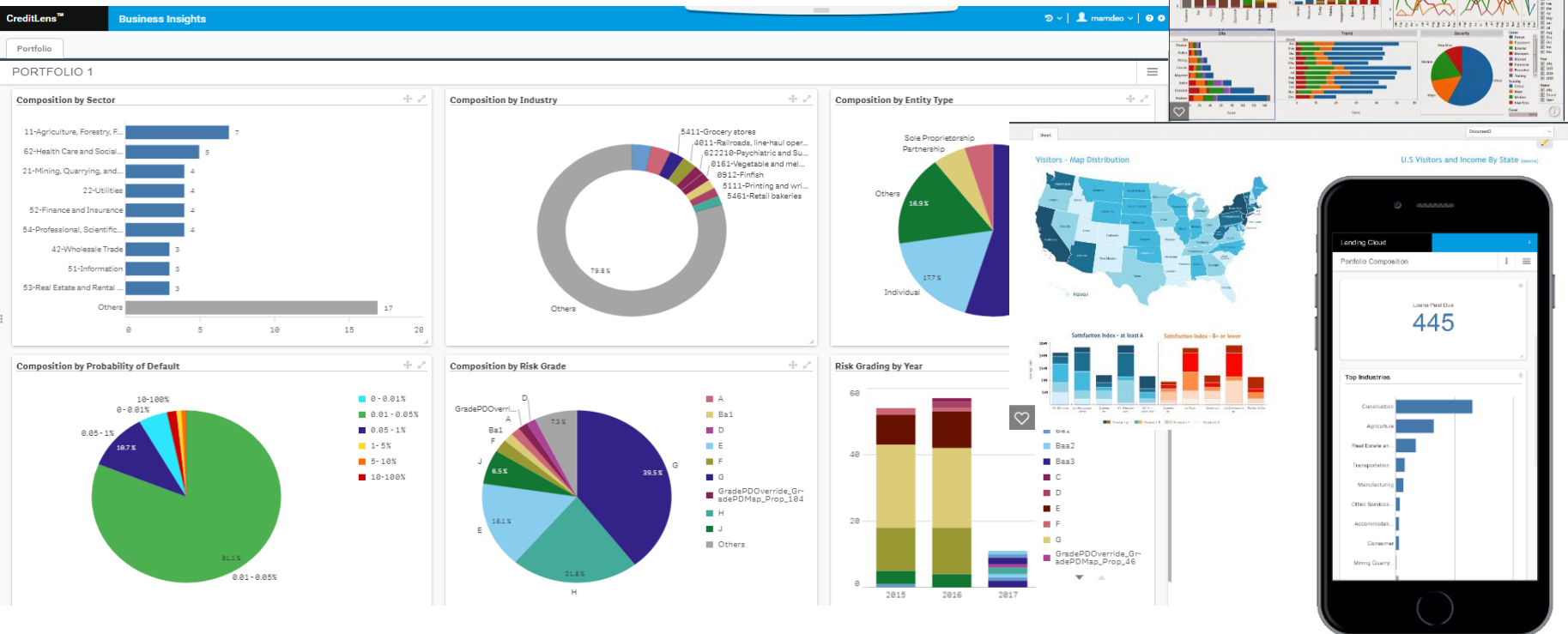
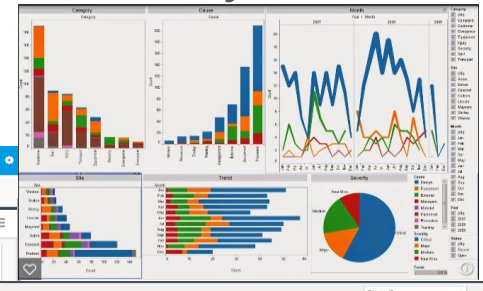
Search Results

<input type="checkbox"/>	Entity Name	Covenant Title	Type	Sub Type	Testing Due Date	Tracking Status	Internal Tracking	Testing Threshold	Actual Value	Co
<input type="checkbox"/>	Berkshire Hathawa...	Degree of Financial L...	Financial	-	5/5/2018	Pending	Yes	≤ 1.5	-	-
<input type="checkbox"/>	Sharp Products LL...	Acid Ratio -Demo	Financial	-	5/15/2018	Pending	Yes	≥ 1	-	-
<input type="checkbox"/>	Berkshire Hathawa...	Operating Ratio	Financial	-	4/30/2018	Due	Yes	≤ 0.5	-	-
<input type="checkbox"/>	Berkshire Hathawa...	Debt to Equity	Financial	-	4/30/2018	Due	No	< 2	-	-
<input type="checkbox"/>	Berkshire Hathawa...	ROE - Return On Equi...	Financial	-	4/30/2018	Due	Yes	≥ 0.2	-	-
<input type="checkbox"/>	Berkshire Hathawa...	Limiting Mergers, Ac...	Non-Financial	Operation	4/30/2018	Due	No	-	-	-
<input type="checkbox"/>	HK asset manage...	Acid Ratio	Financial	-	4/30/2018	Due	Yes	> 1	-	-
<input type="checkbox"/>	Sharp Products LL...	Liquidity Ratio	Financial	-	4/30/2018	Due	Yes	≤ 2, > 1	-	-
<input type="checkbox"/>	Sharp Products LL...	Quick Ratio	Financial	-	4/30/2018	Due	Yes	-	-	-

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Business Insights

Visualize data with integrated and intuitive dashboards for different users from credit analysts to executive management and auditors, providing business intelligence across your team and the entire organization



Deployment Options

Three approaches:

On Premise

- » CreditLens is installed on client site, as RiskAnalyst is currently

Private Cloud

- » CreditLens is hosted by Moody's infrastructure

Public Cloud

- » CreditLens is hosted on a 3rd party site
- » E.g. Amazon AWS
- » Datacenter in EU and or UK





Model Authoring Platform

CreditLens Model Authoring Platform (MAP)

Rating Model

Historical Ratio Assessments | Balance Sheet Factors | Industry / Market | Company | Management

Operations

Profit before Taxes / Total Assets	99	ⓘ
Profit before Taxes / Net Sales	99	ⓘ
Profit before Taxes / Tangible Net Worth	93	ⓘ
Sales (Revenues) Growth	8	ⓘ
Gross Profit Margin	[50]	ⓘ
Net Operating Profit (EBIT) Margin	86	ⓘ
Breakeven Sales (Revenues) Realization	[50]	ⓘ

Debt Service

Earnings Coverage	99	ⓘ
Cash Flow Coverage	99	ⓘ

Calculate | Historical Ratio Assessments 0.00 | 79.57

Rating Scenario Information

Financial Template: MMAAS | Rating Name: Test
 Scenario Type Reference: Base Scenario | Rating Model: Middle Market
 Statement: 12/31/2017 Annual Unconsolidated Statement and Predecessors

Rating Model

Model Calculated Rating: - PD: -

Historical Ratio Assessments:	0.00	31.83	40.00
Balance Sheet Factors:	0.00	12.41	15.00
Industry / Market:	0.00	3.46	10.00
Company:	0.00	-	20.00
Management:	0.00	-	15.00
Total	0.00	-	100.00

Complete

CreditLens
PD/LGD
Ratings

Model Inputs

Model Outputs

```
# Repayment History
score2 <- model.inputs$RepaSme
weight2 <-
  weight.mapping[weight.mapping$Attribute == "RepaSme", 2]
return.data <-
  appendFactor("RepaSme",
              model.inputs$RepaSme,
              weight2,
              score2)
```



R Server

CreditLens Reduces Cost of Ownership

Cloud Deployment



SaaS, Private and Commercial Cloud options

Modular Licensing



Modular not Monolithic

Powerful Configuration



Configuration not Customization

Efficient Upgrades



Frictionless Standard Product Upgrades

Open Architecture



Data Automation & Integration

CreditLens architecture puts the customer back in control

Benefits to Risk Management

Regulatory Compliance

Enforce high standards of compliance in data governance, credit assessment and risk management

Process Efficiency

Increased collaboration, cleaner data, improved communication and automated tools *reduce the 'time to decision' and increase productivity*

Consistency & Control

Consistent capture of financials, approvals and overrides underpin system integrity and *helps simplify oversight and internal policy adherence.*



Business Insight

Sharper, focused and comprehensive data reports driving *better business decisions* and allowing concentration on *pro-active risk assessment and monitoring.*

Operational Risk

Eliminate manual process and financial statement re-entry and duplication *reducing manual effort and increasing the accuracy of data.*

Provisions & Losses

Increasing understanding of credit risk and early detection of warning signals through enhanced monitoring. Reduce probability of losses via more robust risk management

Benefitting the Bottom Line

Revenue & Growth

Generate additional capacity to write more loans by reducing processing time and increasing collaboration amongst the deal team

Profit

Better data governance, accurate risk assessment and increased transparency equals higher quality loans and improved pricing for risk

Customer Satisfaction

Fewer information requests, faster turnaround times and increased quality time with Relationship Managers. Interact digitally at a client convenient time



Technology/Cyber

Trust your critical business operations to advanced, reliable and proven technological architecture and IT .

Culture

Transition to a more modern business environment utilizing the latest technology. Enables further positive cultural advancement in the organization

Credit Risk

A modern way to originate, assess and manage credit leading to better risk management and compliance.

3

Looking Forward

Moody's Analytics Spreading Solution

A comprehensive set of data, tools and services



BvD Orbis

Financials for public and private companies



MARQ

Data extraction from customers' general ledger



Tax Reader

Automated data extraction from tax forms



ML Spreading

Automated spreading of PDF documents



MAKS

Dedicated teams of spreading analysts

Bureau van Dijk



Active BvD ID n° GB03743494 Private The Global Ultimate Owner of this controlled subsidiary is MOODY'S CORPORATION



MOODY'S CORPORATION
NEW YORK, United States of America

M Active Publicly quoted
BvD ID n° US133998945 This company is the Global Ultimate Owner

Key information

WORLD TRADE CENTER 7, 250, GREENWICH STREET
NEW YORK, NY 10007
United States of America

Activity: Corp
Date of incorporation: 02/0
Main stock exchange: New

+1 212 553 0300
www.moodys.com

Previous name: DUN & BRADSTREET CORPORATION (THE) (OLD) until 30/09/2000

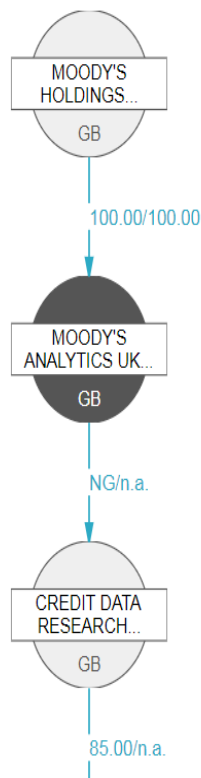
Turnover for 2017
\$ 4.20bn ↑ 16.6%
[More >](#)

Net income for 2017
\$ 1.00bn ↑ 275%
[More >](#)

Ownership
99 shareholders
62 subsidiaries

PEPs and sanctions
There are names that are the same or similar to a risk

Graph - Ownership structure



Gather loan application data digitally and automate spreading.

MARQ™ online loan application

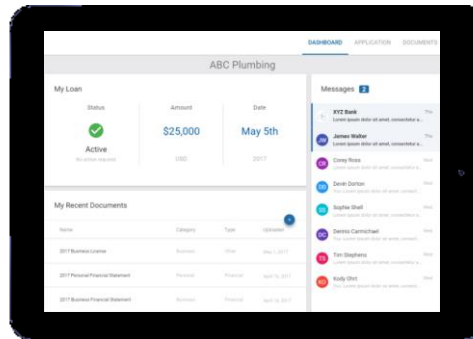
Instantaneous account linking



BORROWER tools

MARQ™ portal

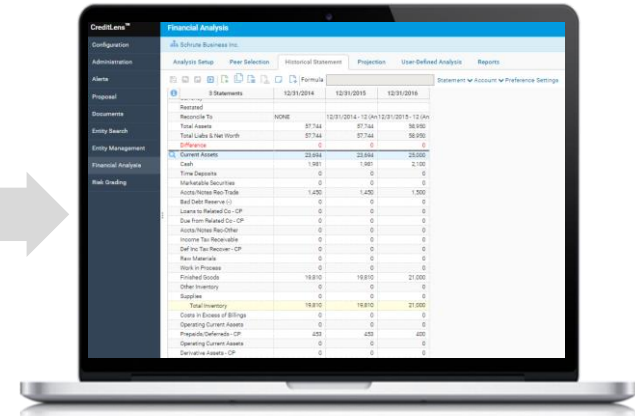
Secure relationship management



BORROWER-LENDER interface

CreditLens™ / Lending Cloud

Automated spreading & scoring



LENDER tools

Spreading Automation

Deep Learning is used to identify financial statement tables

Table Identification



File system

Balance Sheets
December 31, 2004 and 2003

	2004	2003		2004	2003
Assets			Liabilities		
Current assets:			Current liabilities:		
Cash.....	\$ 12,597	\$ 8,173	Note payable.....	\$ 4,200	\$ 4,752
Short-term investments.....	5,003	3,517	Accounts payable.....	375	15
Accounts receivable.....	2,315	3,750	Accrued wages.....	1,579	1,149
Prepaid Rent.....	3,000	3,000	Taxes payable.....	5,386	4,722
Total current assets.....	22,915	18,440	Total current liabilities.....	11,540	10,638
Property, plant and equipment:			Long-term debt.....		
Land and building.....	65,553	28,369		50,000	20,000
Machinery and equipment.....	5,000	3,511	Owner's Equity		
	70,553	31,880	Total owners' equity.....		
Less accumulated depreciation....	5,775	4,321		27,789	20,159
Property and equipment, net.....	64,778	27,559	Total liabilities and owners' equity.....		
Long-term investments.....	1,353	4,587		\$ 89,329	\$ 50,797
Other assets.....	283	211			
Total assets.....	\$ 89,329	\$ 50,797			

Balance Sheets
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extraction from tax
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ML spreading

Automated
spreading of PDF
documents



MAKS

Dedicated teams
of spreading
analysts

4

Alternative Data in Credit Scoring

Motivation

Role of Alternative Data in Credit Scoring and Decisioning



Introduction

Understand credit relevance embedded in text



Text based
information



Credit relevance
model



Credit relevance
score

Company Research

Highlight relevant news
and reviews

Early Warning Indicator

Scan feeds to detect
increased risk

Improve Models

Improve traditional credit
risk models

Method

Train model on historic text sources



Credit relevance
model



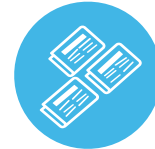
Cutting edge AI research



World leading Credit Risk
expertise, historic data and
models

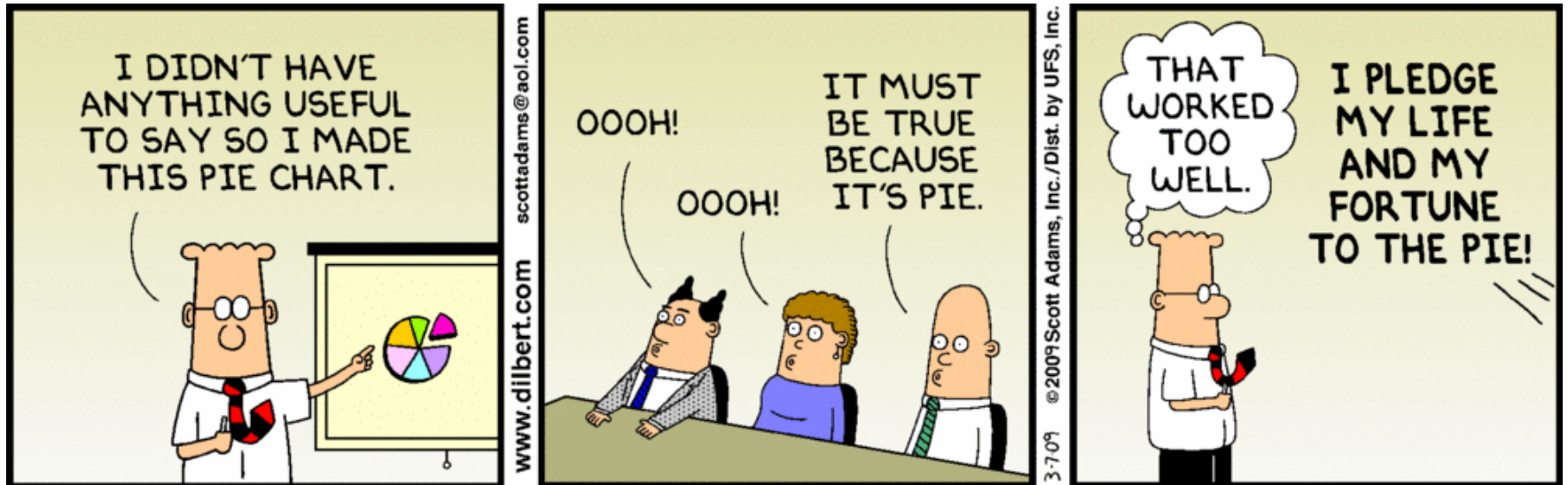


Text Mining & Machine
Learning techniques



Large collection of machine
readable text

Disclaimer



5

News

FINANCIAL TIMES

Thursday June 5 2008 £1.50

Dead rich or dead
2007's entrepreneurs and
the market crash Page 12



Panglossian approach
Private equity's cheap debt
addiction JOHN GAPPER Page 15

Dear Lucy
The duties of a Secretary of
State on Friday or slave Page 16



Suits you Sir Stuart



Third
BAE man
is targeted
by US
officials

News Briefing

Bond markets raising
inflation expectations

Expectations of rises in interest rates to limit profits in the oil sector have raised the level of inflation expectations.

House prices to fall

A 10 year price fall is now expected for the UK house price index.

Taxation offer

Private equity firms are expected to receive a 10% discount on the rate of corporation tax.

Test for Turnbull

Prime Minister Gordon Brown is expected to announce a new test for the Conservative Party.

BP Russia chief in corporate tax probe

Oslo: British oil giant BP's chief executive, Sir Stuart Gulliver, is under investigation by Norwegian tax authorities over alleged tax avoidance.

The Norwegian tax authorities are investigating whether Gulliver has used illegal tax avoidance techniques to reduce BP's tax liability.

The investigation is part of a wider effort by Norwegian tax authorities to combat tax avoidance by multinational corporations.

BP has denied any wrongdoing and says it is cooperating fully with the investigation.

TODAY ON FT.COM

Crude politics

Interactive map: how government policies are changing as the rising cost of oil forces leaders to reconsider subsidies and taxation.



Podcast: Listen to Lucy

Lucy's column on the economy and the market is now available as a podcast.



UMN



CNN

YAHOO! NEWS

REUTERS

BBC NEWS

Google

WORLD POLITICS

CNN.com International - Breaking, Worl...
EDITION: INTERNATIONAL
Set edition preference

Business & Financial News, Breaking US ...
EDITION: U.S.

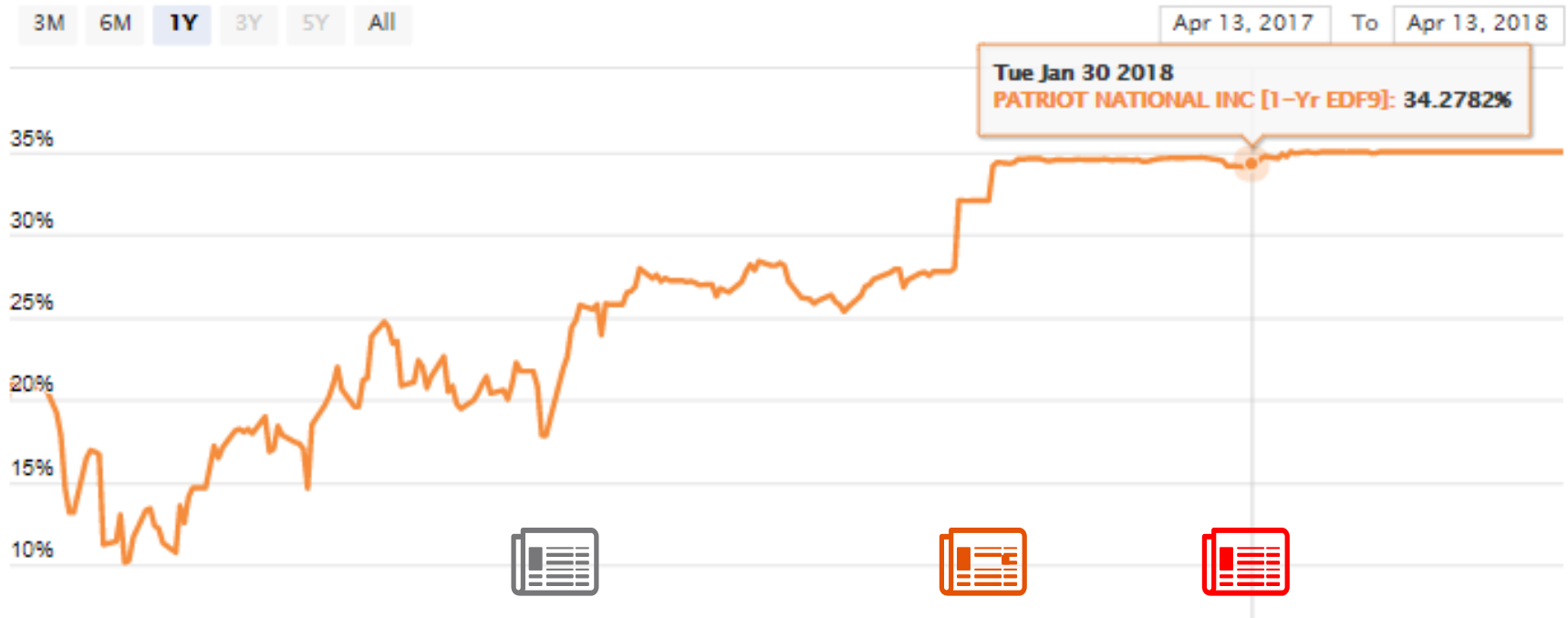
BBC News - Home
http://www.bbc.co

news - Google Search
Web Images Videos Maps News

Breaking News Headlines: Business, Ente...
CBS Evening Ne

Home UK Africa AS
In Pictures Also in

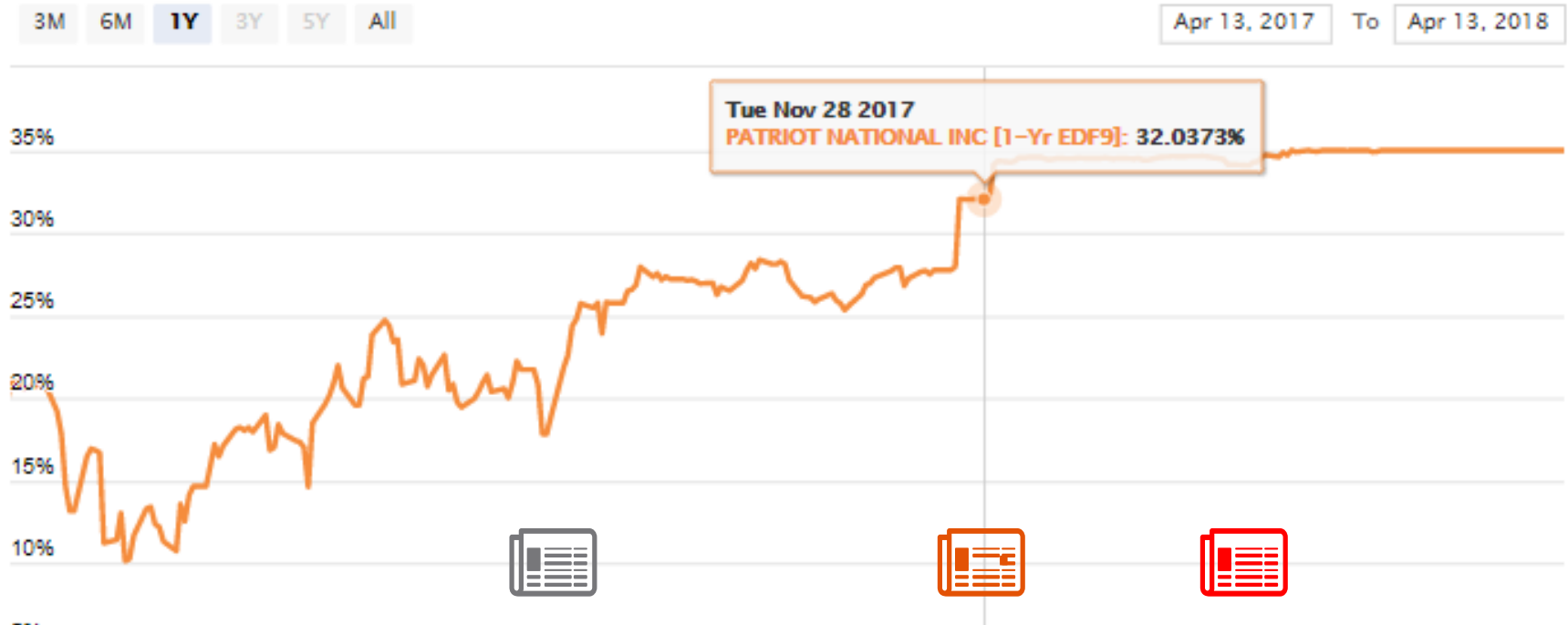
CreditEdge EDF



Patriot National Chapter 11 Petition, Plan Filed

- Patriot National (a/k/a Old Guard Risk Services) and 18 affiliated Debtors filed for Chapter 11 protection with the U. S. Bankruptcy Court in the District of Delaware, lead case number 18-10189.

CreditEdge EDF



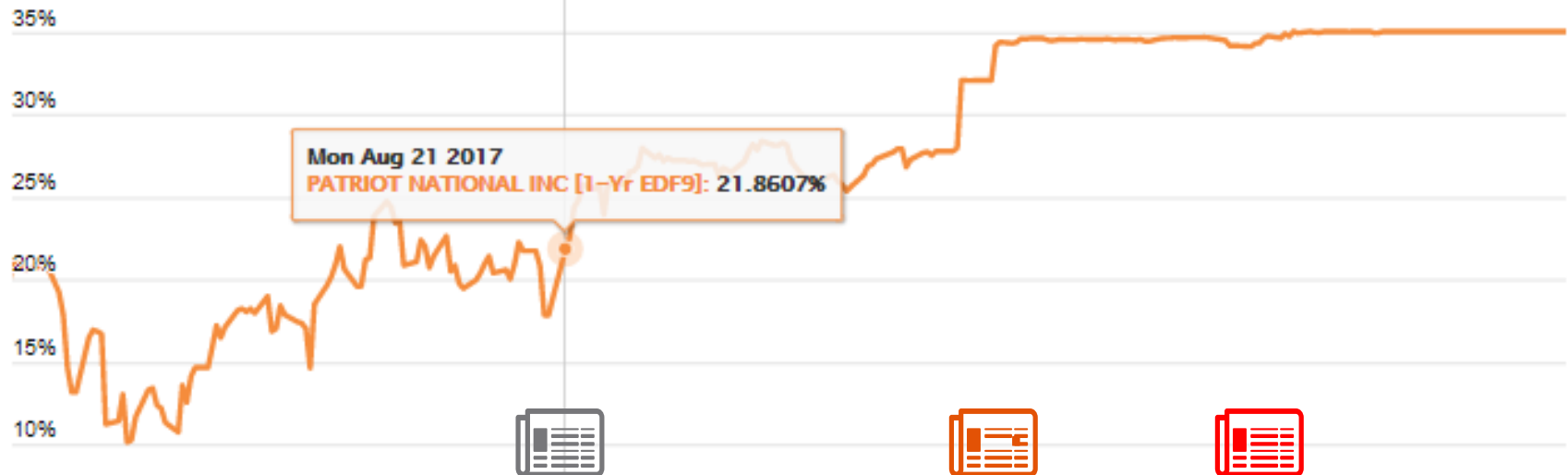
Patriot National, Inc. Alert: Miscellaneous

- On Nov. 28, 2017, Patriot National Inc. entered into a restructuring support agreement with the lenders, including Cerberus Business Finance LLC and TCW Asset Management Co.

CreditEdge EDF

3M 6M **1Y** 3Y 5Y All

Apr 13, 2017 To Apr 13, 2018

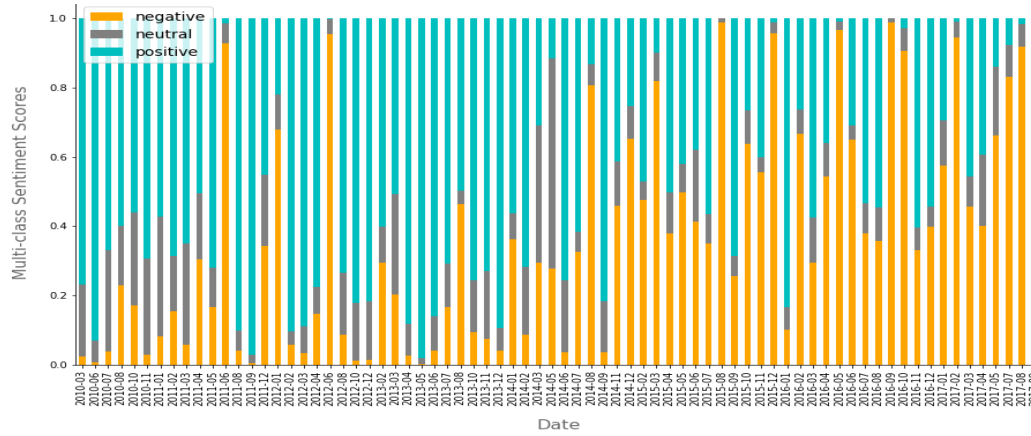


Robbins Arroyo LLP: Patriot National, Inc. (PN) Misled Shareholders According to a Recently Filed Lawsuit

- Shareholder rights law firm Robbins Arroyo LLP announces that a lawsuit was filed against current and former members of the board of directors of Patriot National, Inc. (NYSE: PN) in the U. S. District Court for the Southern District of New York.

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Social Media



great customer services | with professionals and amazing people | more than 62 nation ship and work together .

best trip of my life !!!! went on the 3 day majesty of the sea cruise from feb 13th-16th and it was the most magical experience ever ! best service . most awesome people . royal caribbean is the pinnacle of cruising . will most def be back . thanks for some amazing memories : -

this company is run by arrogant liars . they left my family stranded 6000 miles from home when their travel office failed to make our flight reservations . they emailed us confirmation of our tickets but no tickets had been purchased . after paying an additional \$ 10,000 at the airport in europe in order to get home , the president office at royal caribbean refused to refund what we had paid them for the tickets they never bought . they are crooks .

do not ever book with royal caribbean !!!!! run away now !! this will save you a lot of grief !!! one good thing that happened is the food was so bad that i lost 10 pounds on the cruise !! you have been warned !! the ship is the navigator of the sea that we were on ... we will never use them again !! or their sister lines !!!! really sad rc used to be a class act ... no more ...



Improve Default Prediction

Preliminary research yields promising results



52%

Performance*
of RiskCalc



60%

Performance of
RiskCalc

+

Sentiment
Scoring Model

* Accuracy ratio calculated on matched sample of firms with both Social Media Reviews and RiskCalc EDFs containing 6588 observations with 41 defaults.

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What's next?



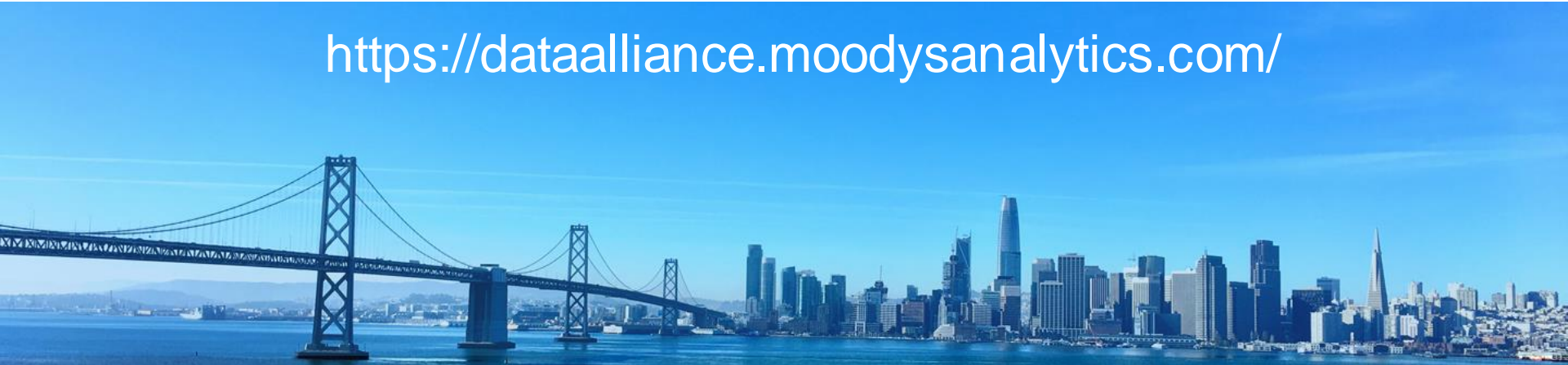
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And Finally

Introducing the Data Alliance

Share Data, Gain Insight, Take Action

<https://dataalliance.moodyanalytics.com/>



A collaborative effort providing high quality credit risk insights for portfolio-level benchmarking and data augmentation



Commercial & Industrial



Project Finance



Commercial Real Estate



Asset Finance



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