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Growth through dimensional decisioning

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Introducing:

- **Herman Jopia**
  American Savings Bank, FSB
- **Armando Ramos**
  Experian

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Outline

- Introduction
- Business context
- Scoring modeling and the binning code
- The pricing problem
- Closing remarks
- Questions and answers

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Introduction

What is dimensional decisioning?

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In the news …

Mortgage Lending Could See Significant Growth in 2015, Fannie Mae Says

By *Erik O'Dell* on

Fannie Mae's n
backs up the be
well, and may d
buying.

The report, whi
economic and s
are no financial
mortgage origin
to downsize ser
plan to grow the
said that they a
focus on more f

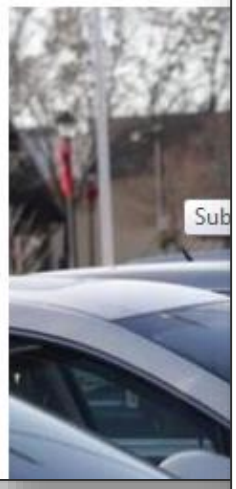
Another 42 per
"moving up." Fu
consumers, whi
income to medi

"In 2013, it was
refinancing," ob
the Fannie Mae
term. A lot of pe

Here's Why High-Risk Subprime Auto Loans Are Growing, But Auto Loan Defaults Aren't

By Angelo Young @angelovoung a.young@ibtimes.com on January 28 2015 3:34 PM

f 12



Solid Consumer Credit Growth in November

WELLS FARGO

Fri, Jan 9 2015, 14:05 GMT
by John Silvia | Wells Fargo

0 0 Tweet Like 0 g+1 Share Share

Consumer credit increased a solid $14.1 billion in November on the heels of an upward revision to October data. Revolving credit declined, although we suspect a rebound in December.

Nonrevolving Credit in the Driver's Seat

Consumers increased borrowing in November at a moderately slower pace than October, with overall credit growing a net $14.1 billion. Although overall credit came in about $1 billion below expectations, October data were revised upwards and indicates that this slower-than-expected credit growth is no reason for concern. Nonrevolving credit made up the entire gain, growing $15 billion, while revolving

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What is dimensional decisioning?

Dimensional decisioning is the use of a series of scores and attributes to make better decisions and grow the portfolio

Layering of scores and attributes

- Create optimal prospect lists
- Increase conversion rates
- Build customer loyalty
- Increase campaign effectiveness to align with business objectives
- Increase customer profitability

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Business context

- Objective and goals
- Banking industry / economic environment
- Analytics: a core asset at ASB
- Prescreen campaigns

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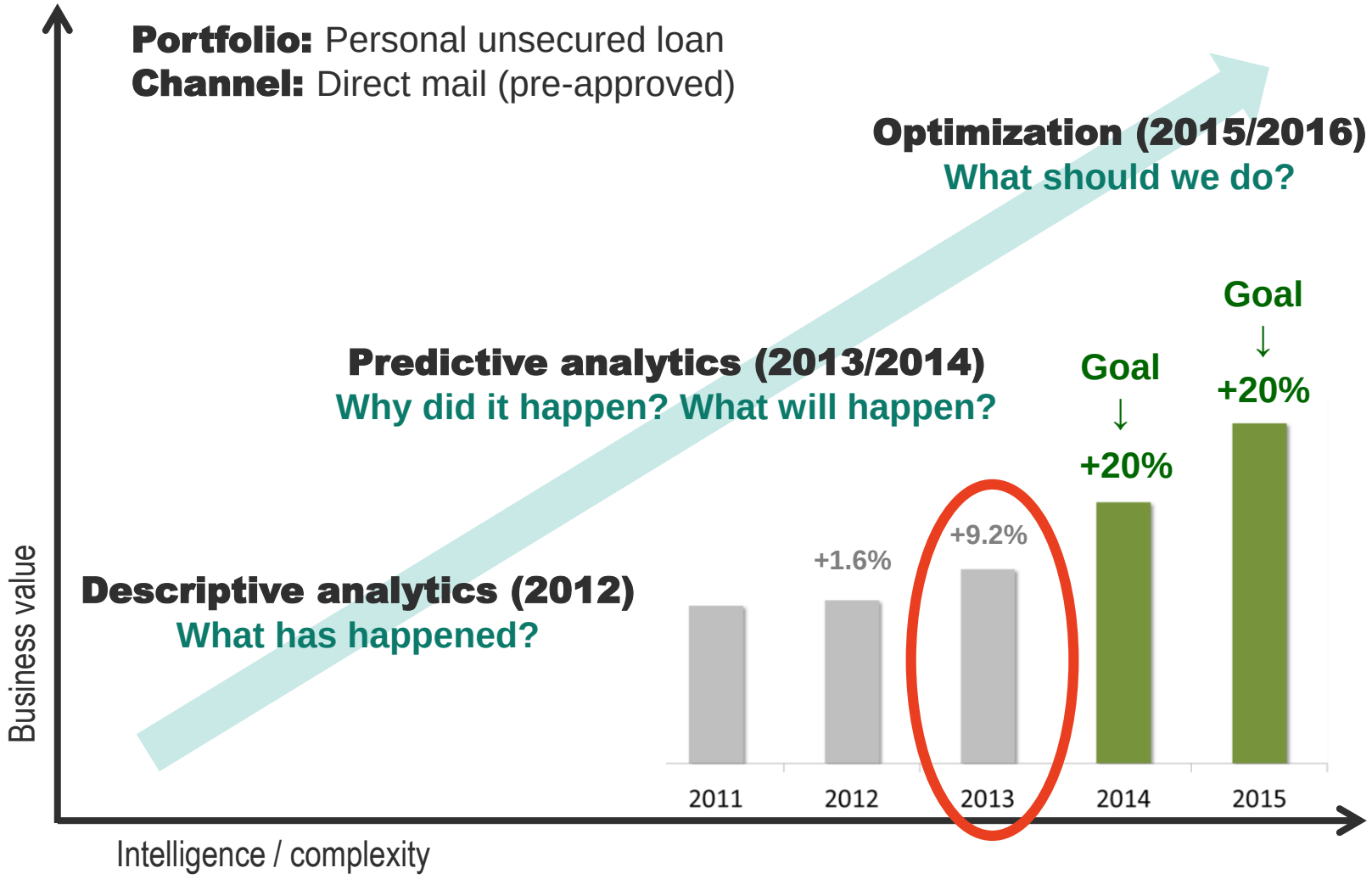
Objective

Drive volume and profits through **data and analytics**



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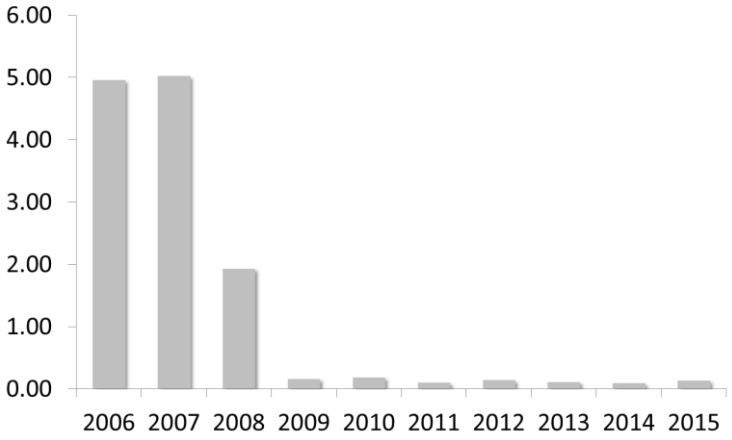
Challenges and opportunities

Economy, population, competition, skills

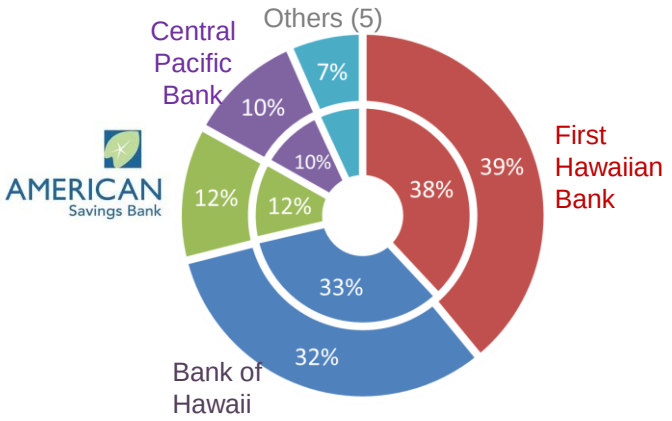
Low Interest Rate Environment

Federal Funds Rate: Not Seasonally Adjusted



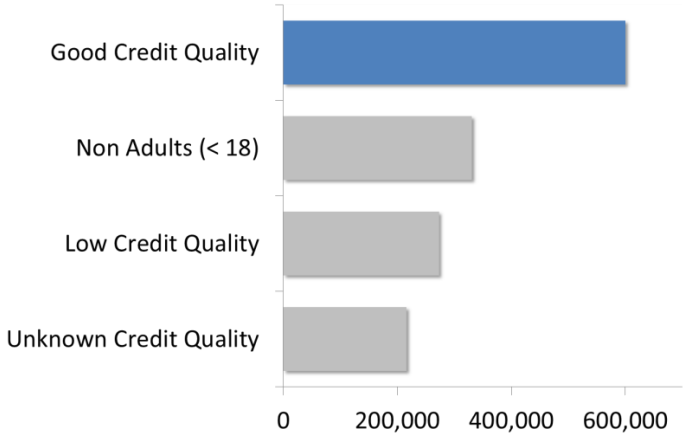
Hawaii: Standard And Conservative Market

Assets Distribution (B$): 2011 - 2014



Hawaii: Limited Population (1.4 M)

Estimated based on Census Data



Analytics Skills Gap

Map of University Programs in Data Analytics

http://data-informed.com/bigdata_university_map

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Challenges and opportunities

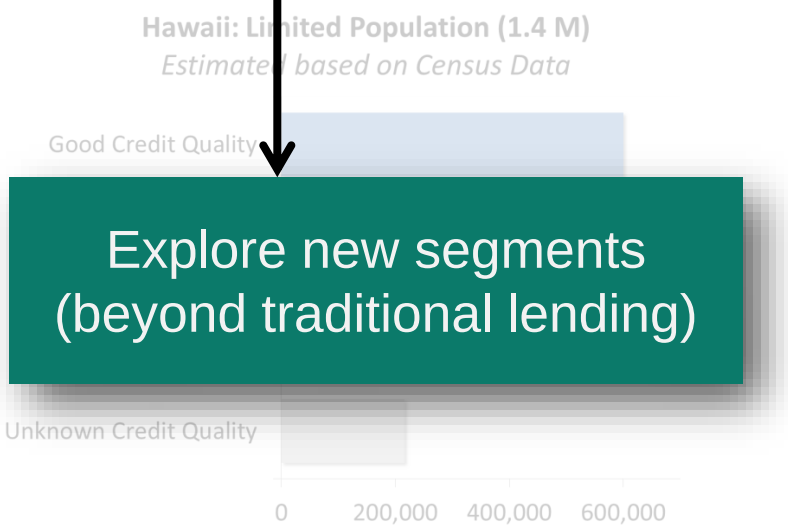
What should we do?

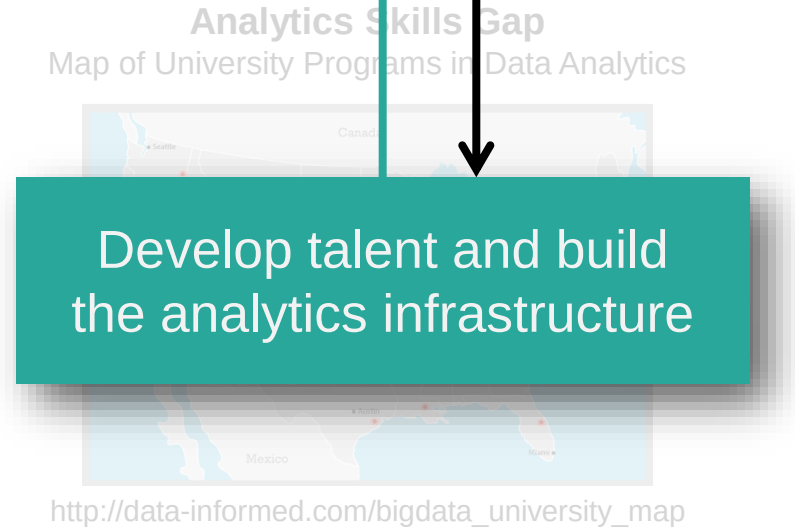
Targeting: the right offer for the right person

Business as usual was not going to work

Explore new segments (beyond traditional lending)

Develop talent and build the analytics infrastructure





http://data-informed.com/bigdata_university_map

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Leadership team

Fully committed with analytics

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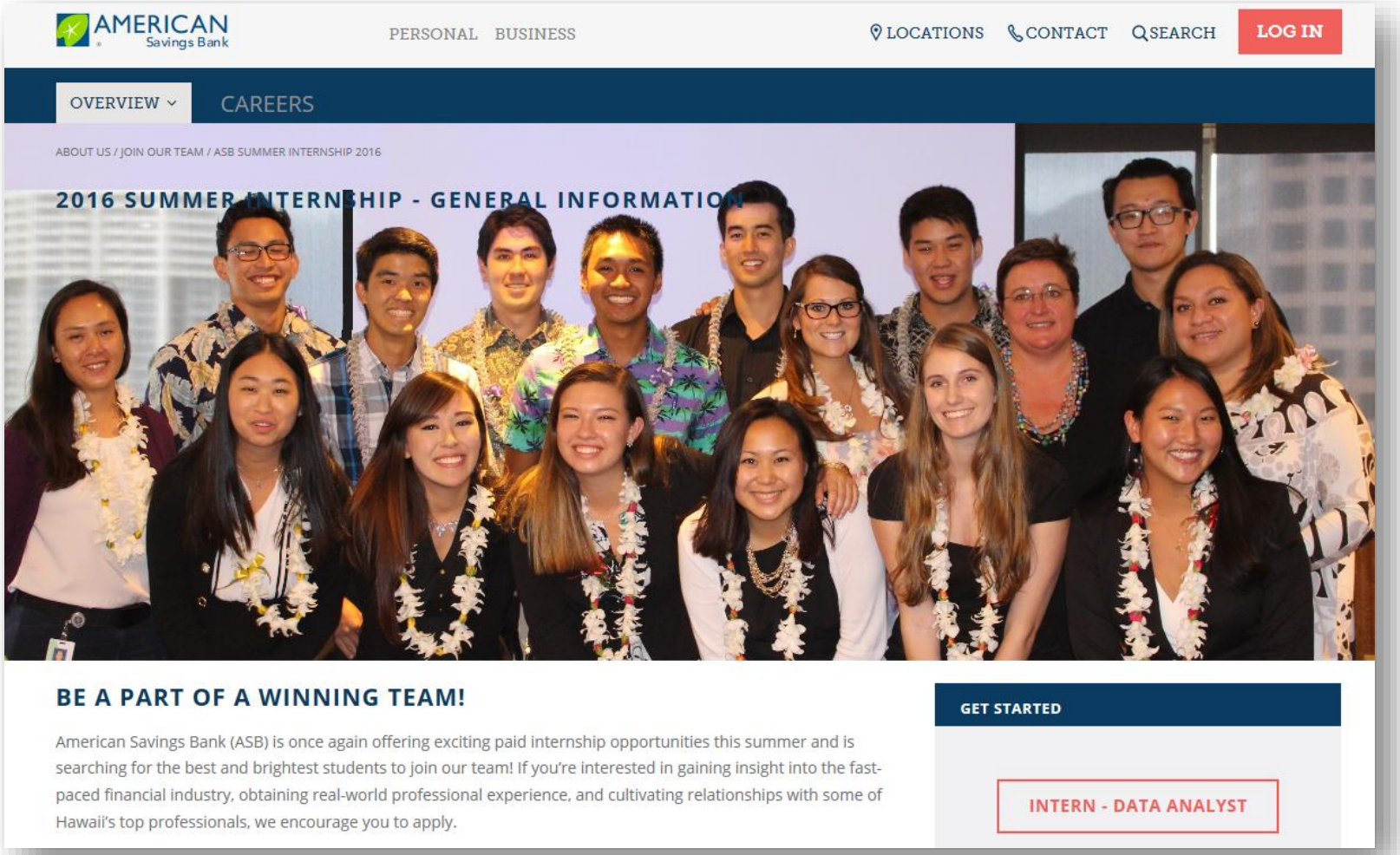
Leadership team

Example: Analytics internship / intern – data analyst



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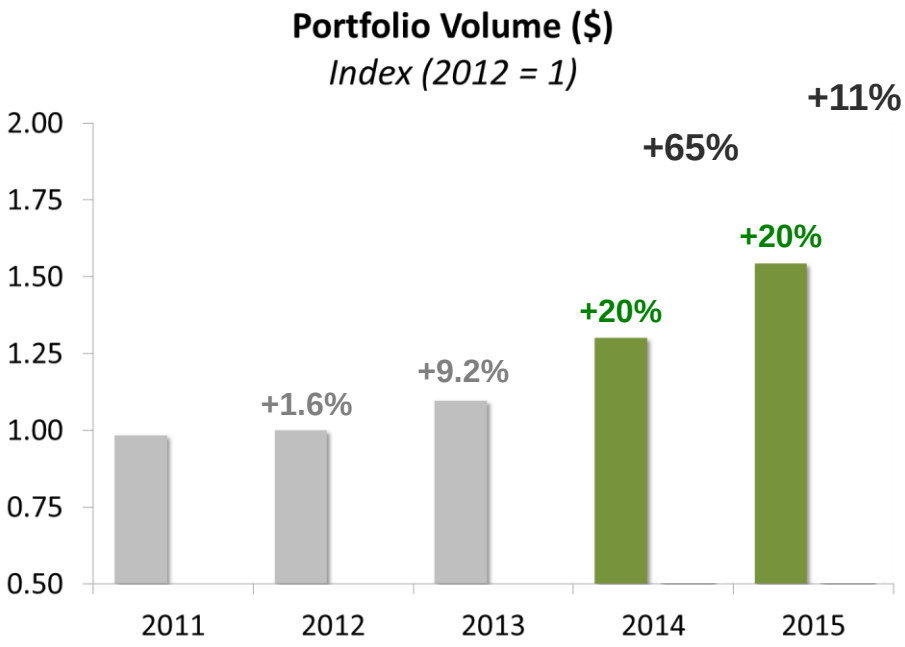
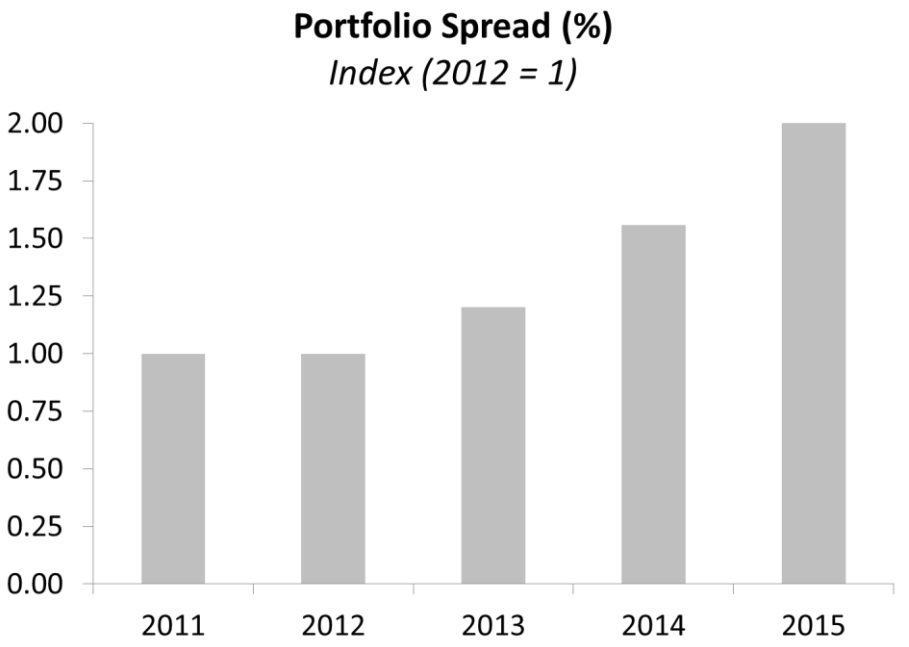
Goals vs. actuals

Did we make it? How?





Understand the market	Understand your business	Understand your capabilities	Evaluate results and models
Find **high value opportunities** and compete wisely	What are the **drivers** of your profits ?	Are you able to implement and **execute** your ideas?	Yes, **metrics** … but are you getting the expected **results?**

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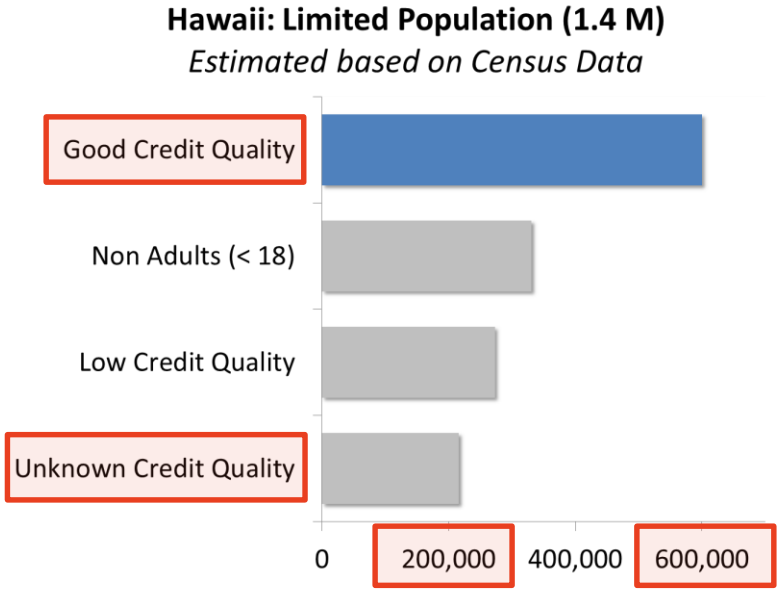
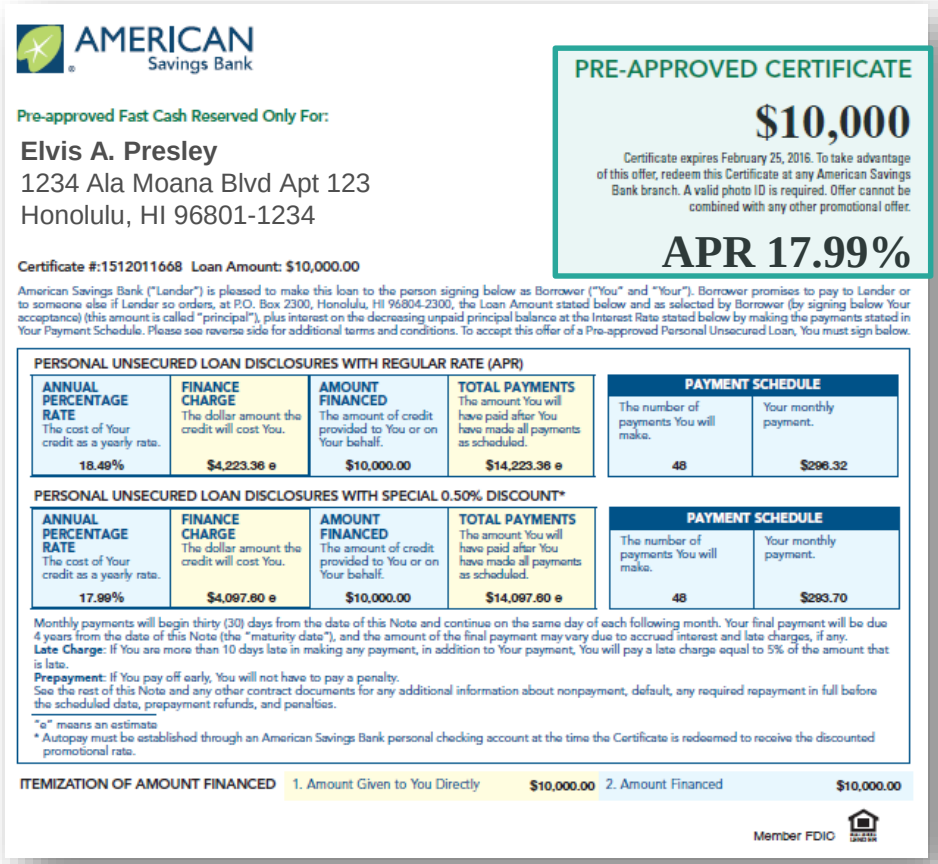
The market
Matured and standardized

What : Installment loan
When : By season
Who : Prime consumers
How : Pre-approved offers



Better targeting → **Scoring modeling**



AMERICAN Savings Bank

PRE-APPROVED CERTIFICATE

$10,000

Certificate expires February 25, 2016. To take advantage of this offer, redeem this Certificate at any American Savings Bank branch. A valid photo ID is required. Offer cannot be combined with any other promotional offer.

APR 17.99%

Pre-approved Fast Cash Reserved Only For:

Elvis A. Presley
1234 Ala Moana Blvd Apt 123
Honolulu, HI 96801-1234

Certificate #:1512011668 Loan Amount: $10,000.00

American Savings Bank ("Lender") is pleased to make this loan to the person signing below as Borrower ("You" and "Your"). Borrower promises to pay to Lender or to someone else if Lender so orders, at P.O. Box 2300, Honolulu, HI 96804-2300, the Loan Amount stated below and as selected by Borrower (by signing below Your acceptance) (this amount is called "principal"), plus interest on the decreasing unpaid principal balance at the Interest Rate stated below by making the payments stated in Your Payment Schedule. Please see reverse side for additional terms and conditions. To accept this offer of a Pre-approved Personal Unsecured Loan, You must sign below.

PERSONAL UNSECURED LOAN DISCLOSURES WITH REGULAR RATE (APR)

ANNUAL PERCENTAGE RATE The cost of Your credit as a yearly rate.	FINANCE CHARGE The dollar amount the credit will cost You.	AMOUNT FINANCED The amount of credit provided to You or on Your behalf.	TOTAL PAYMENTS The amount You will have paid after You have made all payments as scheduled.	PAYMENT SCHEDULE: The number of payments You will make.	PAYMENT SCHEDULE: Your monthly payment.
18.49%	$4,223.36 e	$10,000.00	$14,223.36 e	48	$296.32

PERSONAL UNSECURED LOAN DISCLOSURES WITH SPECIAL 0.50% DISCOUNT*

ANNUAL PERCENTAGE RATE The cost of Your credit as a yearly rate.	FINANCE CHARGE The dollar amount the credit will cost You.	AMOUNT FINANCED The amount of credit provided to You or on Your behalf.	TOTAL PAYMENTS The amount You will have paid after You have made all payments as scheduled.	PAYMENT SCHEDULE: The number of payments You will make.	PAYMENT SCHEDULE: Your monthly payment.
17.99%	$4,097.60 e	$10,000.00	$14,097.60 e	48	$293.70

Monthly payments will begin thirty (30) days from the date of this Note and continue on the same day of each following month. Your final payment will be due 4 years from the date of this Note (the "maturity date"), and the amount of the final payment may vary due to accrued interest and late charges, if any.
Late Charge: If You are more than 10 days late in making any payment, in addition to Your payment, You will pay a late charge equal to 5% of the amount that is late.
Prepayment: If You pay off early, You will not have to pay a penalty.
See the rest of this Note and any other contract documents for any additional information about nonpayment, default, any required repayment in full before the scheduled date, prepayment refunds, and penalties.

"e" means an estimate
* Autopay must be established through an American Savings Bank personal checking account at the time the Certificate is redeemed to receive the discounted promotional rate.

ITEMIZATION OF AMOUNT FINANCED 1. Amount Given to You Directly $10,000.00 2. Amount Financed $10,000.00

Member FDIC

Better offers → **Price optimization**
"The right offer for the right customer"

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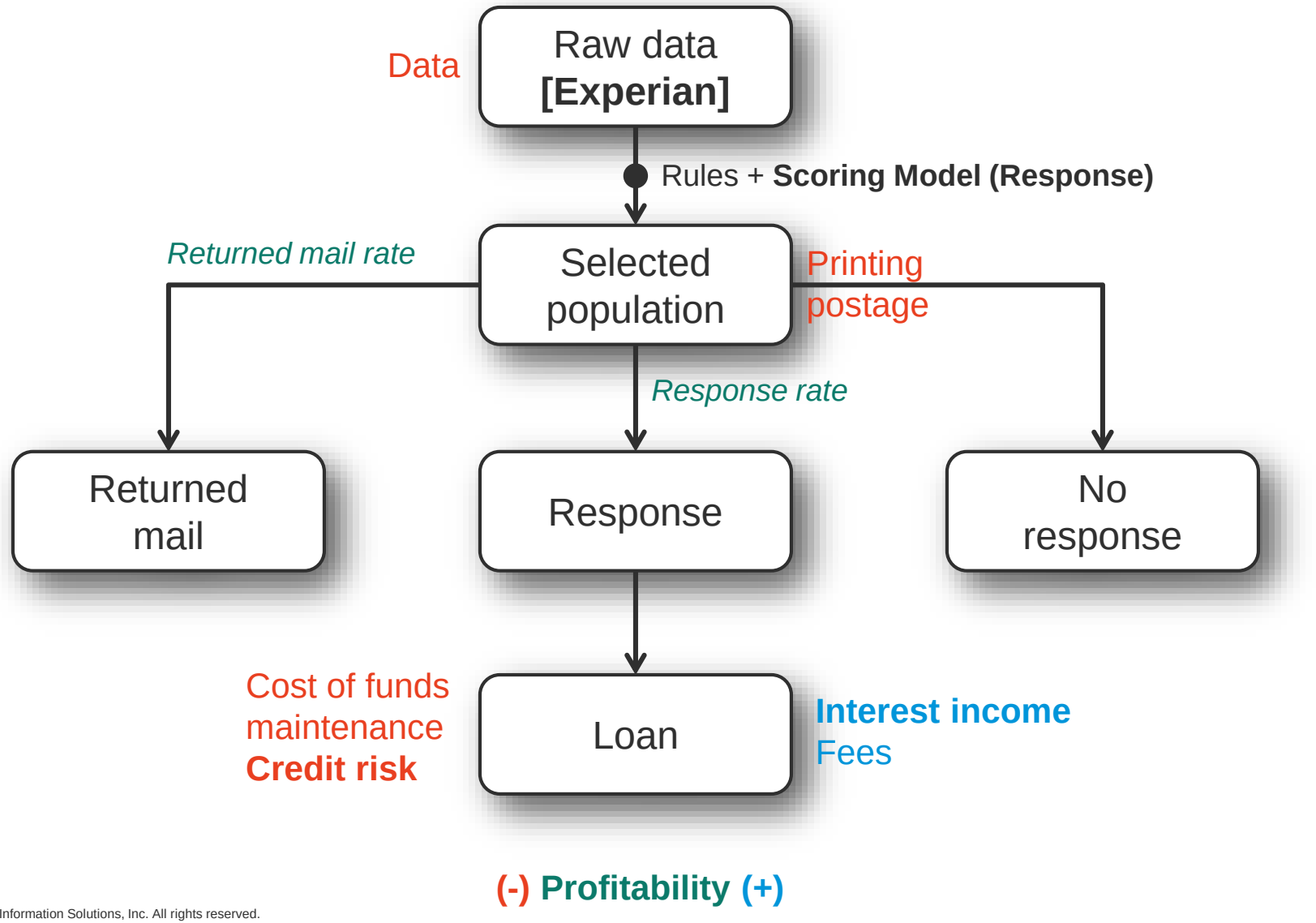
Direct mail
The process



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Scoring modeling

- What is it?
- Scorecard example and definitions
- The development process
- Optimal binning
- R package **`'smbinning'`**

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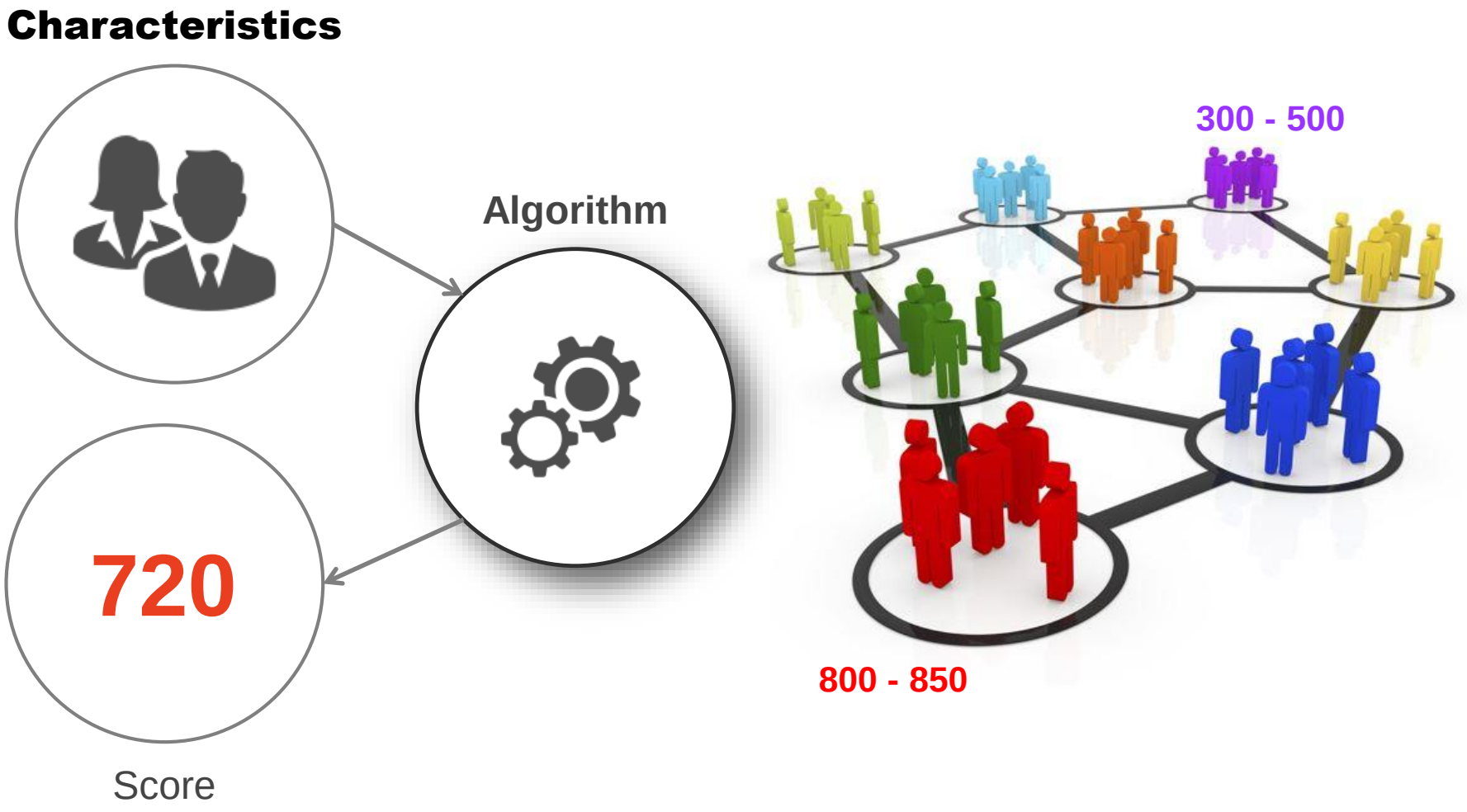
What is a scoring model?

An algorithm that, based on known characteristics, generates a number or Score that represents the probability of a certain event



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Scorecard

Example: Response model

Characteristics

Attributes or Bins

Customer Relationship	
No Relationship	**70**
0 - 11 Months	100
12 - 23 Months	130
24 - 48 Months	160
48 Months +	**200**

Credit Score 1	
No Score / Missing	210
300 - 682	**280**
683 - 704	230
705 - 735	180
736 - 850	**110**

Net Worth	
No Assets	100
< $1,000	**140**
< $ 10,000	120
< $ 100,000	100
$100,000 +	**50**

Credit Score 2	
No Score / Missing	150
300 - 627	**230**
628 - 713	180
714 - 728	130
729 - 850	**70**

Points

Min Score = 300

Max Score = 850

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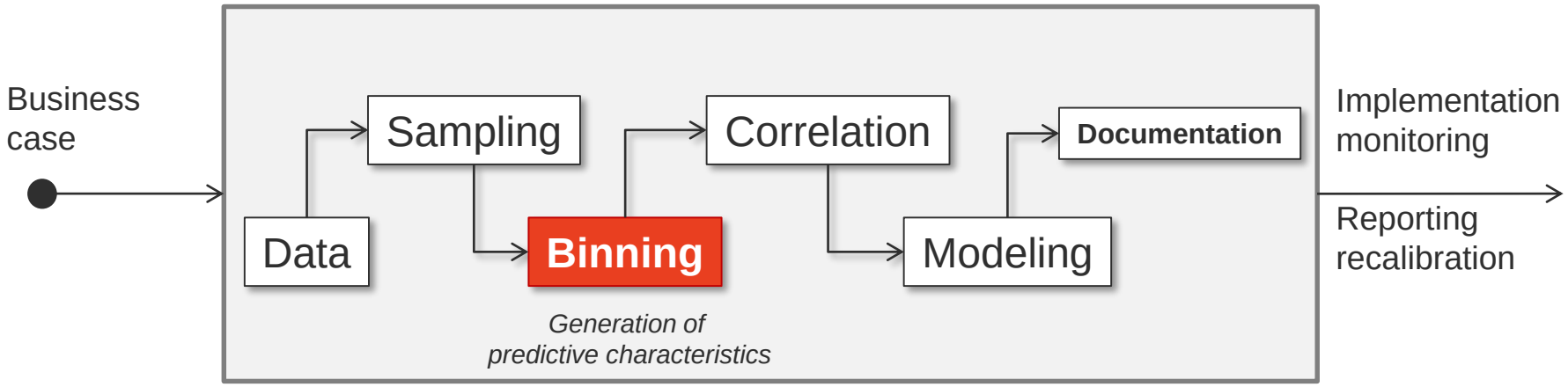
The development
Decisions / stages



Decisions		Development	
		External	Internal
Model	Custom	↑ Budget ↑ Time ↑ Accuracy	↓ Budget ↓ Time ↑ Accuracy Skills
	Generic	↓ Budget ↓ Time ↓ Accuracy	Not Likely

Performance chart

Binning

Credit Score 1 (CS1)

No Score / Missing	210
300 - 682	280
683 - 704	230
705 - 735	180
736 - 850	110

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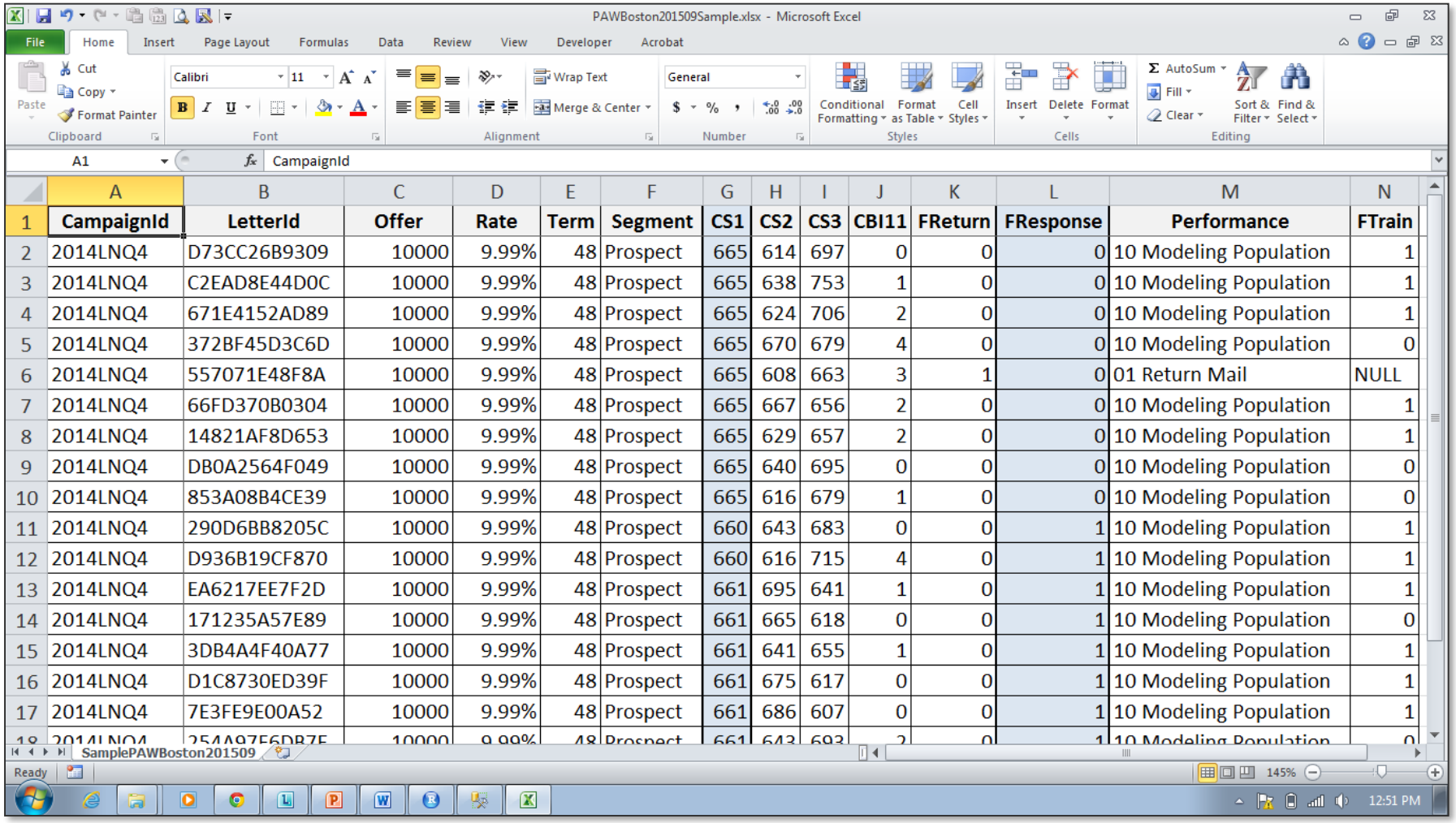
The development

Sample dataset / binning



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	CampaignId	LetterId	Offer	Rate	Term	Segment	CS1	CS2	CS3	CBI11	FReturn	FResponse	Performance	FTrain
2	2014LNQ4	D73CC26B9309	10000	9.99%	48	Prospect	665	614	697	0	0	0	10 Modeling Population	1
3	2014LNQ4	C2EAD8E44D0C	10000	9.99%	48	Prospect	665	638	753	1	0	0	10 Modeling Population	1
4	2014LNQ4	671E4152AD89	10000	9.99%	48	Prospect	665	624	706	2	0	0	10 Modeling Population	1
5	2014LNQ4	372BF45D3C6D	10000	9.99%	48	Prospect	665	670	679	4	0	0	10 Modeling Population	0
6	2014LNQ4	557071E48F8A	10000	9.99%	48	Prospect	665	608	663	3	1	0	01 Return Mail	NULL
7	2014LNQ4	66FD370B0304	10000	9.99%	48	Prospect	665	667	656	2	0	0	10 Modeling Population	1
8	2014LNQ4	14821AF8D653	10000	9.99%	48	Prospect	665	629	657	2	0	0	10 Modeling Population	1
9	2014LNQ4	DB0A2564F049	10000	9.99%	48	Prospect	665	640	695	0	0	0	10 Modeling Population	0
10	2014LNQ4	853A08B4CE39	10000	9.99%	48	Prospect	665	616	679	1	0	0	10 Modeling Population	0
11	2014LNQ4	290D6BB8205C	10000	9.99%	48	Prospect	660	643	683	0	0	1	10 Modeling Population	1
12	2014LNQ4	D936B19CF870	10000	9.99%	48	Prospect	660	616	715	4	0	1	10 Modeling Population	1
13	2014LNQ4	EA6217EE7F2D	10000	9.99%	48	Prospect	661	695	641	1	0	1	10 Modeling Population	1
14	2014LNQ4	171235A57E89	10000	9.99%	48	Prospect	661	665	618	0	0	1	10 Modeling Population	0
15	2014LNQ4	3DB4A4F40A77	10000	9.99%	48	Prospect	661	641	655	1	0	1	10 Modeling Population	1
16	2014LNQ4	D1C8730ED39F	10000	9.99%	48	Prospect	661	675	617	0	0	1	10 Modeling Population	1
17	2014LNQ4	7E3FE9E00A52	10000	9.99%	48	Prospect	661	686	607	0	0	1	10 Modeling Population	1
18	2014LNQ4	254A97E6DB7E	10000	9.99%	48	Prospect	661	643	693	2	0	1	10 Modeling Population	0

CS1: Numeric; **FResponse** Binary (1: Response, 0: No Response); **N** = 100,000

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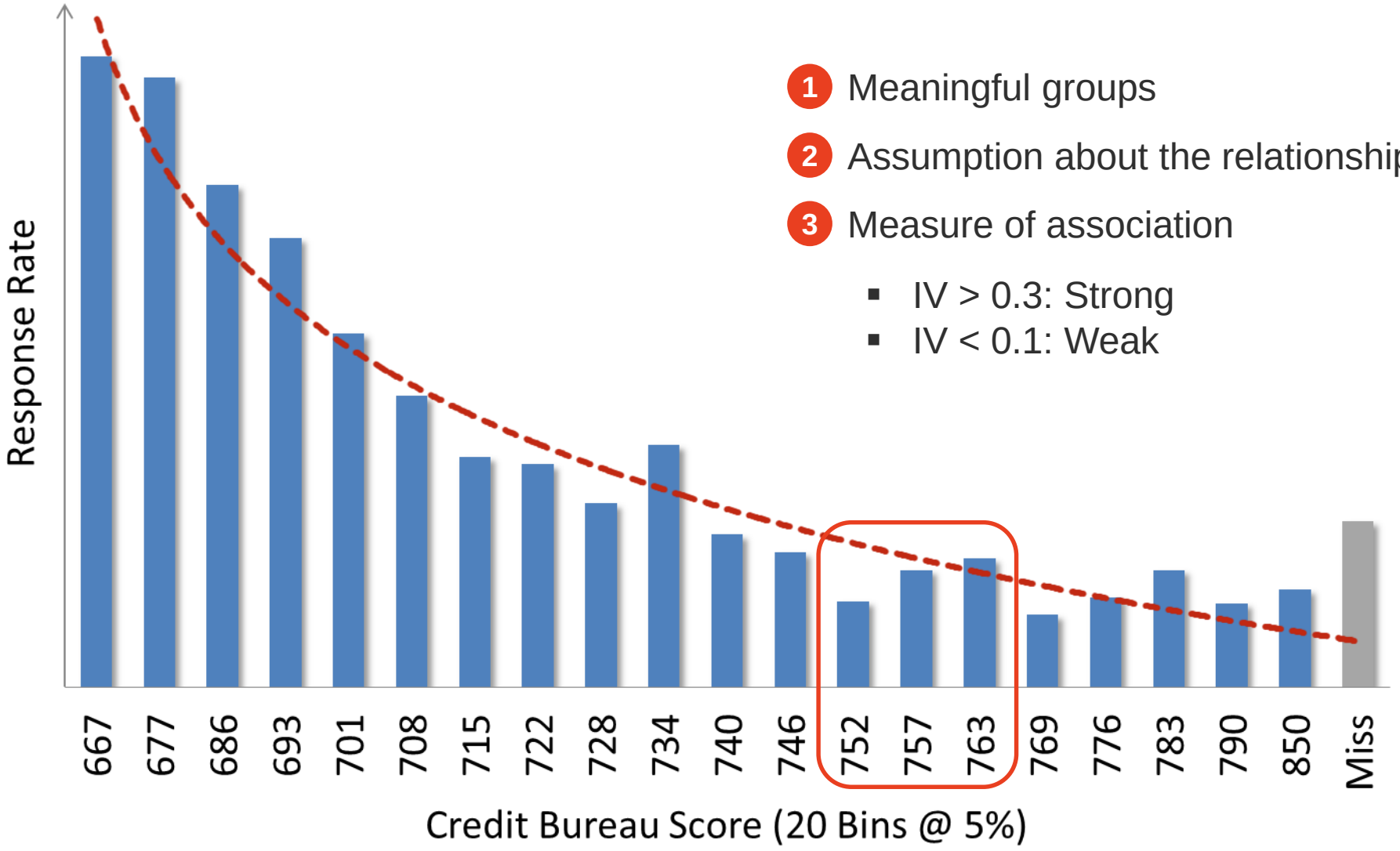
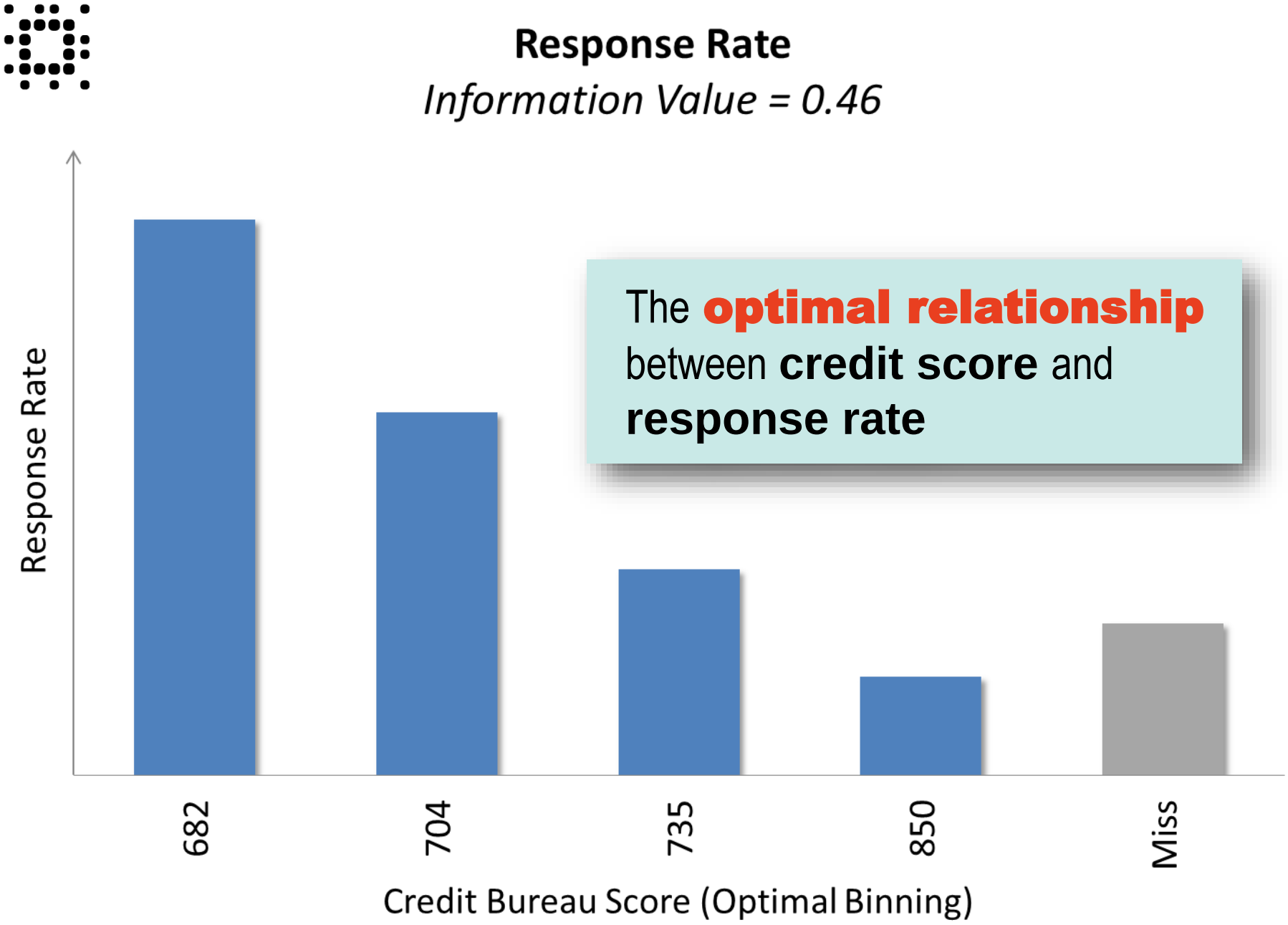
Response Rate

Information Value = 0.48



1. Meaningful groups
2. Assumption about the relationship
3. Measure of association
   - IV > 0.3: Strong
   - IV < 0.1: Weak


Response Rate
Information Value = 0.46
Response Rate
682
704
735
850
Miss
Credit Bureau Score (Optimal Binning)
The optimal relationship between credit score and response rate

R Package: smbinning

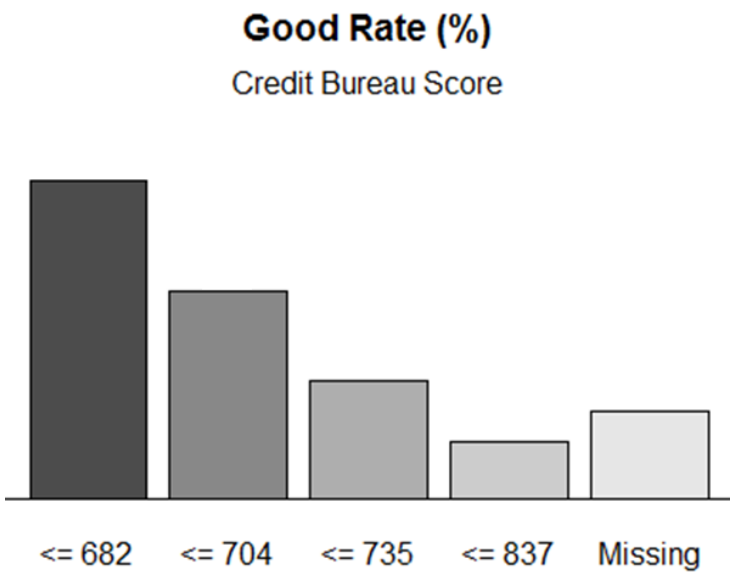
Optimal binning for scoring modeling

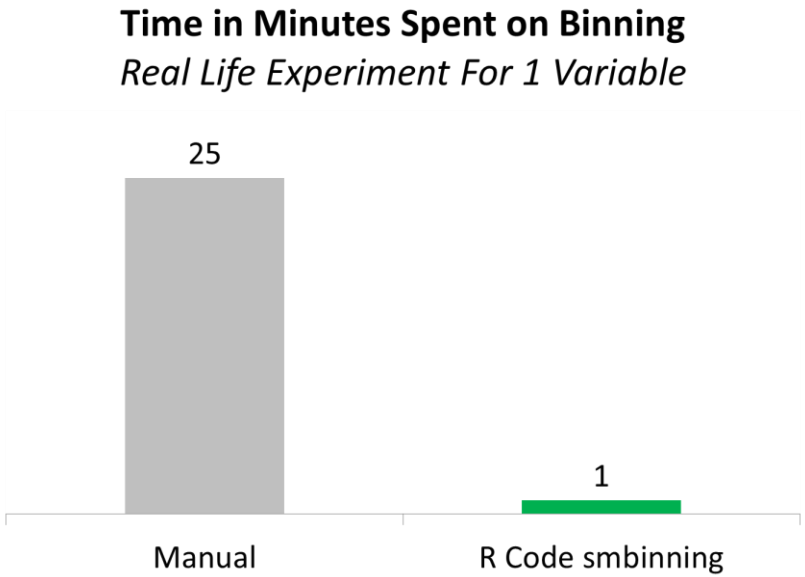
R is Free !

```
# Once the data is loaded in R ...
> result = smbinning(df=dfpultrain, y="FResponse", x="CS1", p=0.05)

# Plot Response Rate
> smbinning.plot(result,option="goodrate",sub="Credit Bureau ...")

# Information Value
> result$iv
[1] 0.4627
```





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R Package: smbinning

Optimal binning for scoring modeling

http://www.scoringmodeling.com

- Documentation
- References
- Video
- R Code examples

https://cran.r-project.org/package=smbinning

- Documentation

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Price optimization

- The pricing problem
- Personal unsecured term loan
- Real life optimization
- Results

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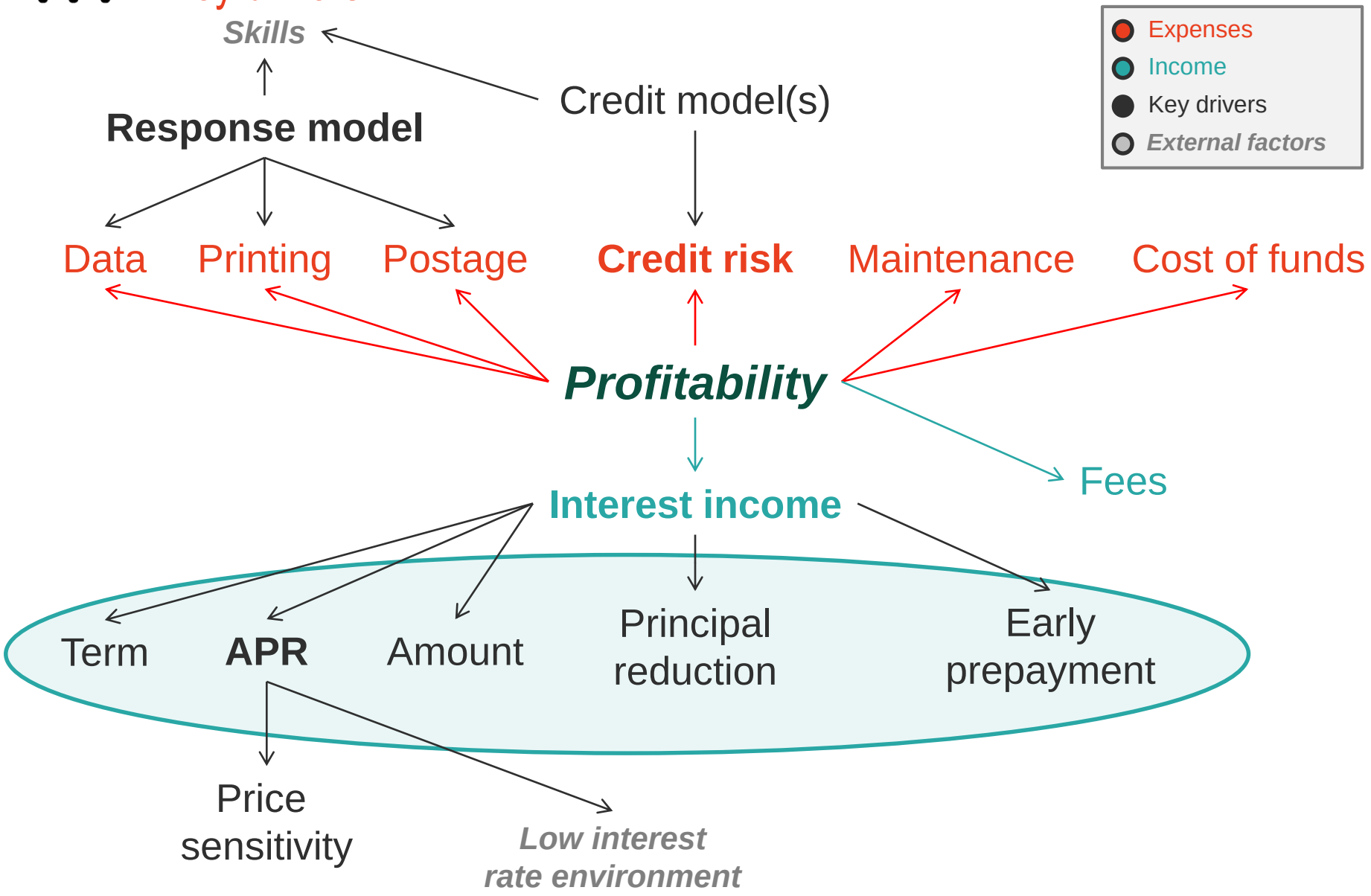
Pricing problem

Key drivers



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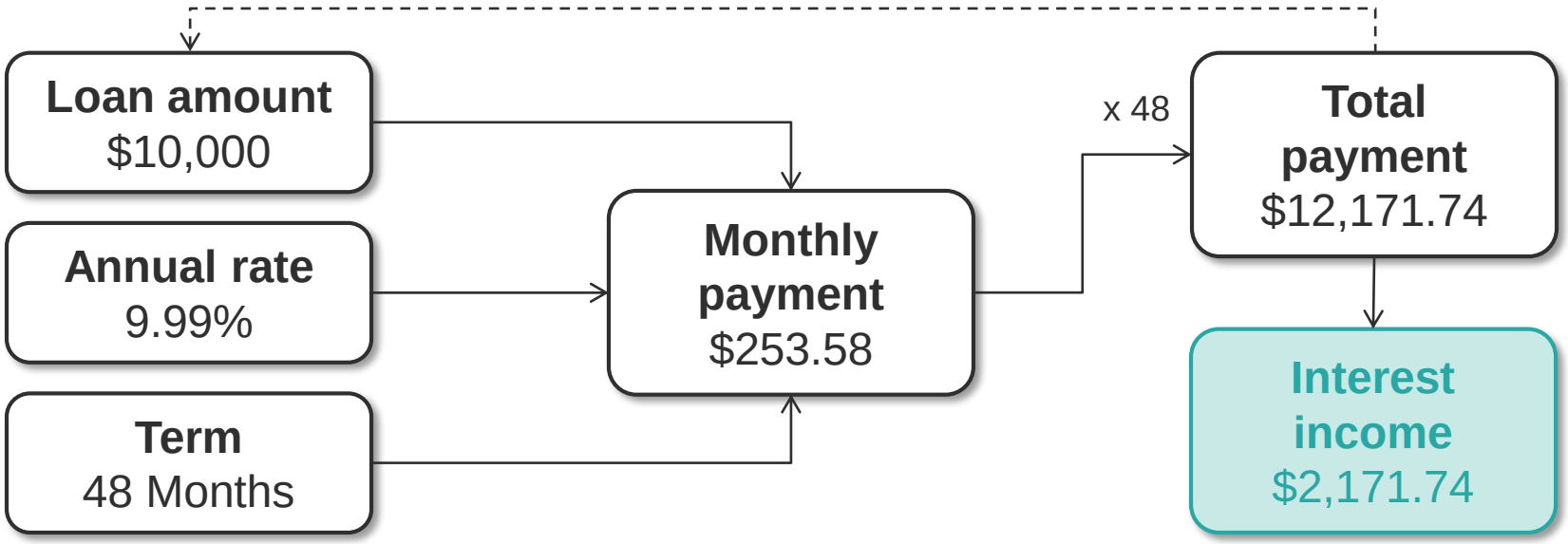
The product

Personal unsecured loan



What if customer pays the loan on month 30? → $1,829.94

What if customer pays additional 50 $/month? → $1,736.94

What if customer does not pay at all? → **($10,000)**

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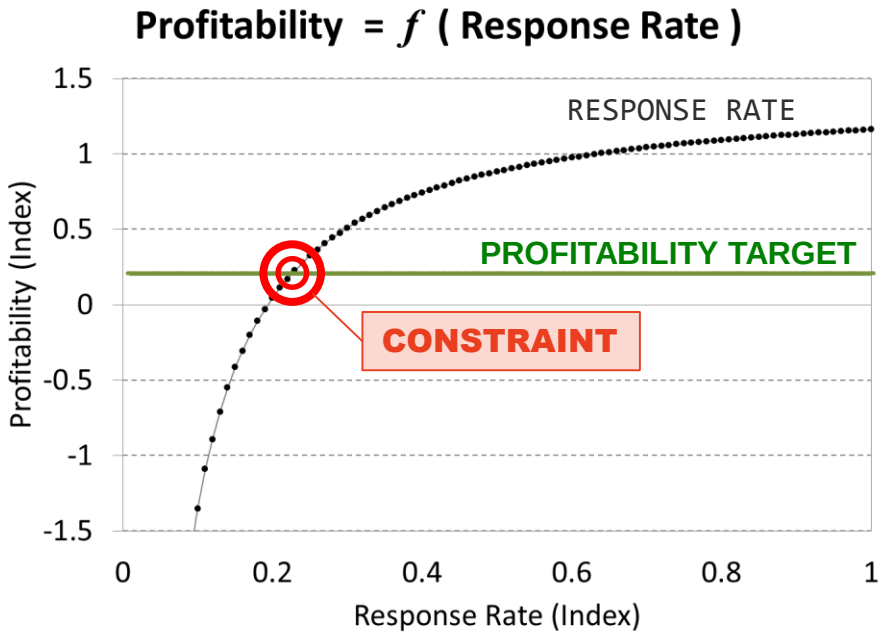
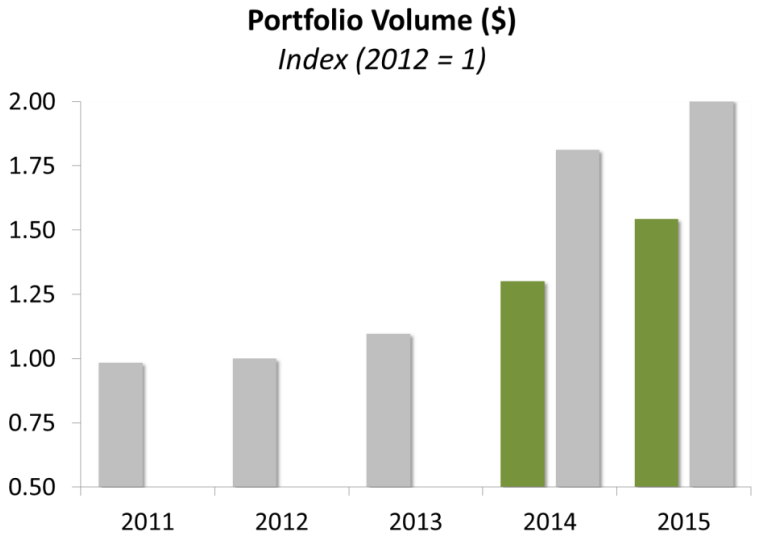
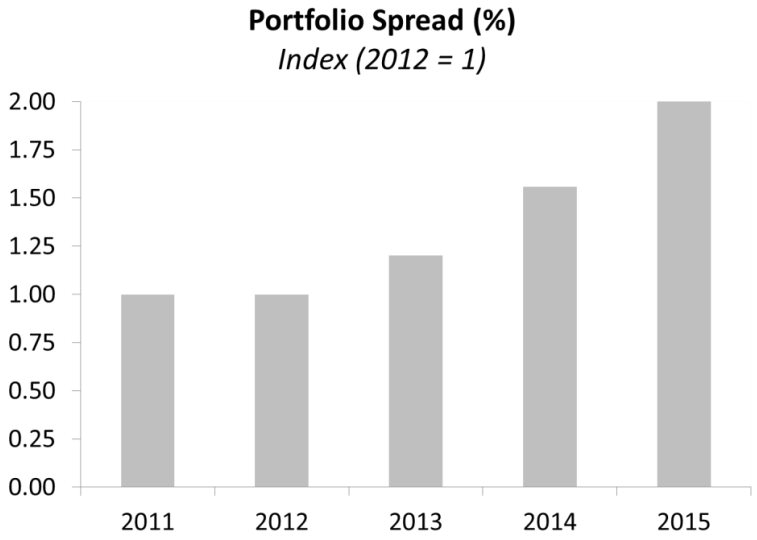
Pricing problem
Real life optimization

Understand the market | **Understand your business** | Understand your capabilities | **Evaluate results and models**







- Set **profitability** targets (%, $)
  - Make money!
- Quantify **driver's contribution**
  - Set the right constraints
- Understand **price sensitivity**
  - Test (play) and learn

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VISION 2016

TAKE CONTROL

A ROADMAP FOR GROWTH

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Closing remarks

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Summing up

Build your own path to success

- Understand your **market, business,** and **capabilities.** Then apply **PA**
- Demonstrate the benefits of **PA** and earn trust → It's all about results
- Embrace **complexity:**
  - **Coding** saves time, a lot of time (example: smbinning)
  - **Scoring models** help to make better decisions (example: response)
- Apply "real life" **optimization** (moving targets, dynamic constraints)
- Data (lack of) is never the issue → make assumptions, test, repeat
- Be the first in the market
- **"Business as usual"** will never get you where you want / need to be

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For additional information, please contact:

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Share your thoughts about Vision 2016!

Please take the time now to give us your feedback about this session.
You can complete the survey in the mobile app or request a paper survey.

Vision Conference
Breakout Session Survey

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1. How would you rate the presenters' knowledge?
☐ Excellent ☐ Above average ☐ Average ☐ Below average ☐ Poor

2. How would you rate the presenters' delivery?
☐ Excellent ☐ Above average ☐ Average ☐ Below average ☐ Poor

3. How would you rate the presenters' time management?
☐ Excellent ☐ Above average ☐ Average ☐ Below average ☐ Poor

4. How useful was the session information?
☐ Very useful ☐ Somewhat useful ☐ Neutral
☐ Somewhat not useful ☐ Not useful

5. How would you rate the session on being current?
☐ Very current ☐ Somewhat current ☐ Neutral
☐ Somewhat not current ☐ Not current

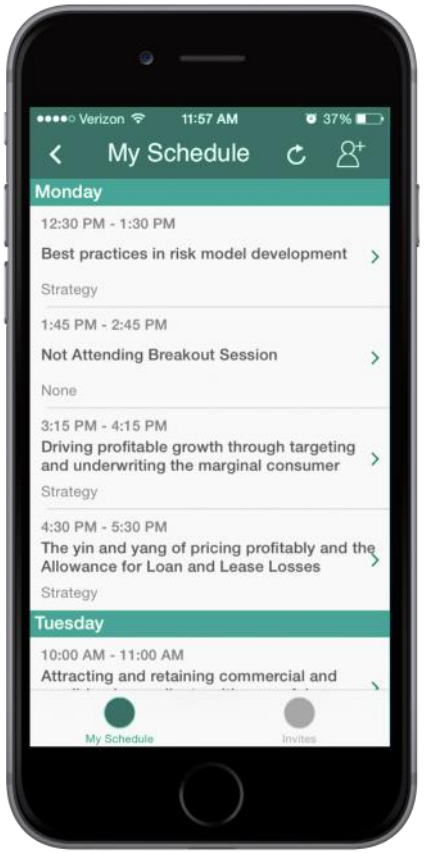
6. How relevant was the session content to the title and description?
☐ Very relevant ☐ Somewhat relevant ☐ Neutral
☐ Somewhat not relevant ☐ Not relevant

7. How would you rate the level of content?
☐ Too advanced ☐ Just right ☐ Too basic

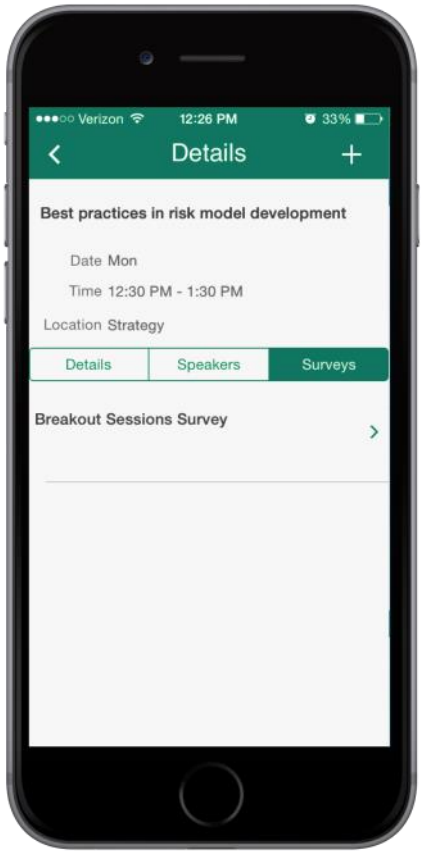
8. Why did you attend this session? (Check all that apply.)
☐ Relates to my business ☐ The presenter(s) ☐ Interest in new product
☐ Compelling session description ☐ Increase product knowledge

9. Do you have any additional comments?

1 Select the Survey button and complete



2 Select the breakout session you attended



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