Best practices in risk model development

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Introducing:

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  Experian

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  Experian

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Risk modeling landscape

- Market conditions
- Regulatory compliance
- More and better data
- Stronger tools
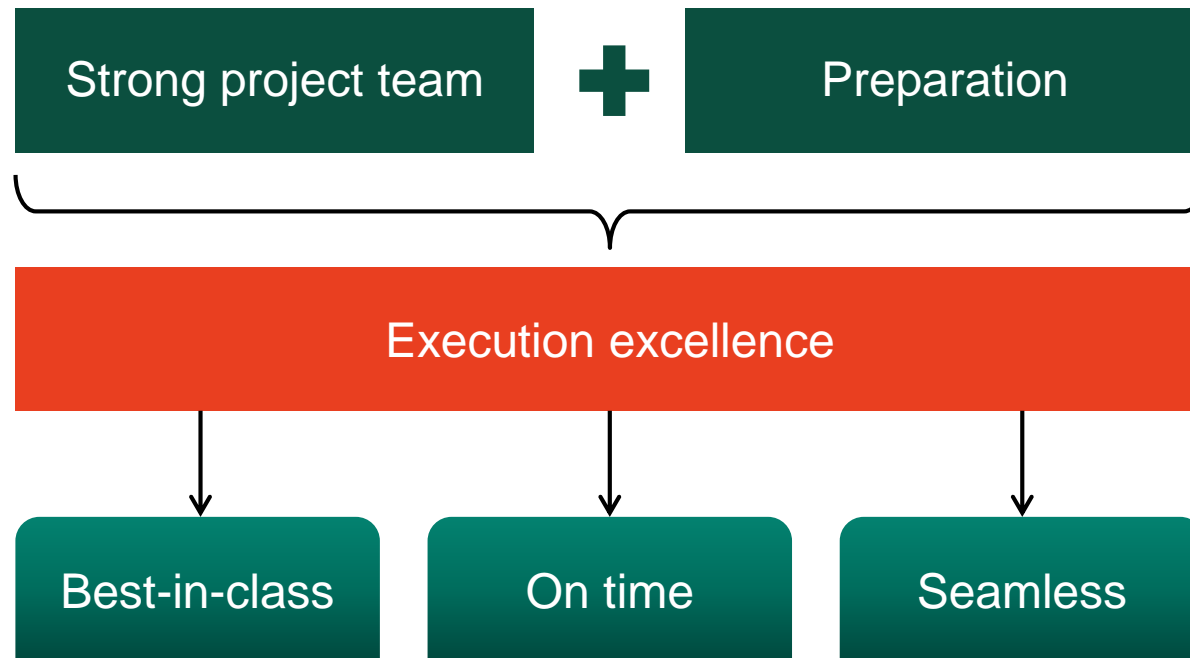
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Model applications

	Account acquisition	Account management	Account loss
Risk management	▪ **Front-end risk** ▪ Pre-screen risk ▪ Fraud ▪ Bankruptcy ▪ First payment default	▪ Behavioral ▪ CLI ▪ Roll rate ▪ Delinquency ▪ Transactional fraud	▪ Early stage collections ▪ Late stage collections ▪ Recovery
Marketing efforts	▪ Response ▪ Activation ▪ Conversion ▪ Purchase propensity	▪ Profitability ▪ Usage ▪ Activation / reactivation ▪ Balance transfer ▪ Cross-sell	▪ Attrition/churn ▪ Pre-payment ▪ Retention

Risk modeling
Drivers of success

| Strong project team | **+** | Preparation |

Execution excellence

Best-in-class | On time | Seamless

Model development process

| Project inception | Data prep | Inference | Segmentation | Model development | Documentation | Implementation |

Project inception

- Assemble project team

Project inception	Data prep	Inference	Segmentation	Model development	Documentation	Implementation

Project inception
Key participants

- Project sponsor
- Line of business
- Risk managers
- Analysts
- IT
- Compliance
- Project manager
- Third party consultants

Comprehensive
Collaborative
Committed

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Project inception

- Assemble project team

- Establish clear objectives

- Evaluate lending environment

- Define model development parameters

Project inception	Data prep	Inference	Segmentation	Model development	Documentation	Implementation

Project inception
Define model development parameters
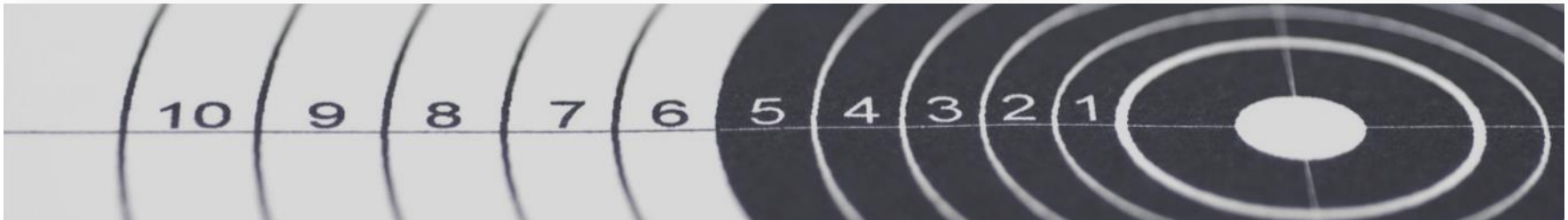
- Sample parameters
  - ▸ Target population
  - ▸ Sample time frame
  - ▸ Performance definitions
  - ▸ Performance window
  - ▸ Exclusions
- Data sources and attribute candidates

- Model design
  - ▸ Inference
  - ▸ Segmentation
  - ▸ Attribute selection
  - ▸ Modeling technique
  - ▸ Model performance measurement
- Implementation considerations

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Project inception
Example parameters by model application

	Prescreen solicitation	Account acquisition	Credit line authorizations reissue	Attrition	Collections
Tool	Prescreen scoring	New applicant scoring	Behavior scoring	Behavior scoring	Collection scoring
Data sources at observation	Credit bureau demographic	Application credit bureau customer	Masterfile credit bureau	Masterfile credit bureau demographic	Masterfile credit bureau
Performance window	2–3 months	12–24 months	6–12 months	3–6 months	3–6 months
Performance flags	Response / non-response profitable / unprofitable	Good / bad	Good / bad	Stay / attrite	$ collected / no collection

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Project inception
Define model development parameters
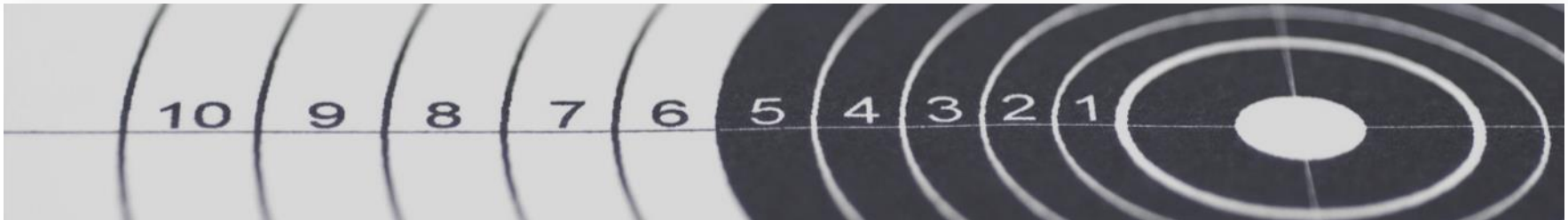
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Project inception
Roadblocks and potential risks

Progress impeded

- Lack of representation from key stakeholders

- Poor stakeholder communication and/or competing objectives

- Weak project management is counterproductive

Potential risks

- Don't move forward with design decisions without stakeholder consensus

- Poorly designed samples may limit model shelf life

- Consider implementation planning now

| Best-in-class | On time | Seamless |

Data preparation

- Data extraction

- Standard data integrity checks and multi-dimensional EDA

  - ► Portfolio reports

  - ► Population Stability Index (PSI)

  - ► Characteristic analysis

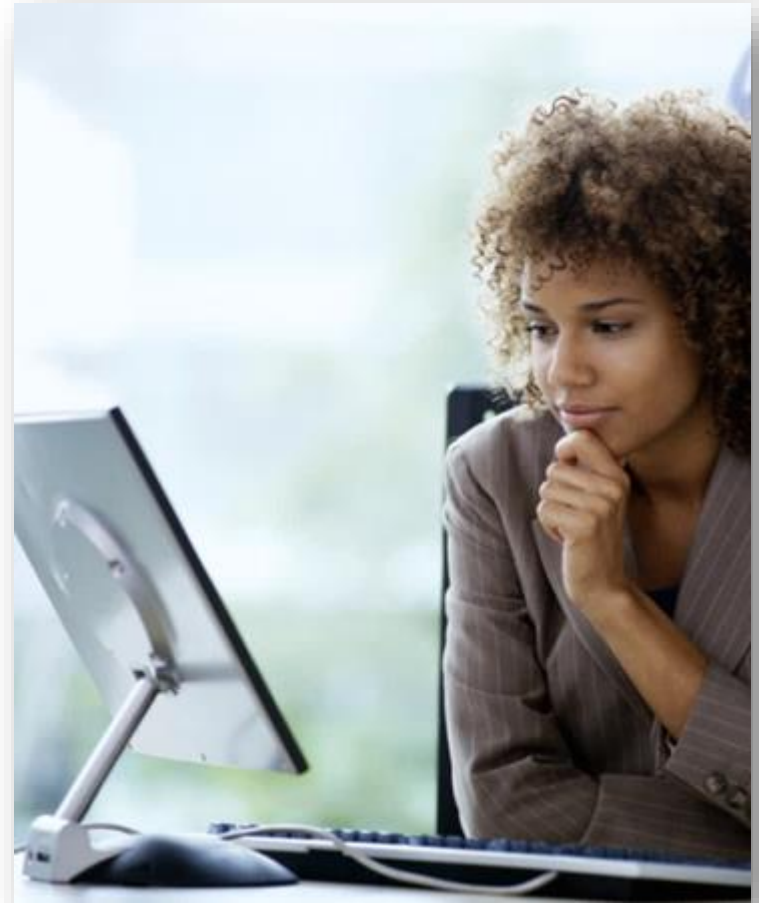| Project inception | **Data prep** | Inference | Segmentation | Model development | Documentation | Implementation |

Data preparation
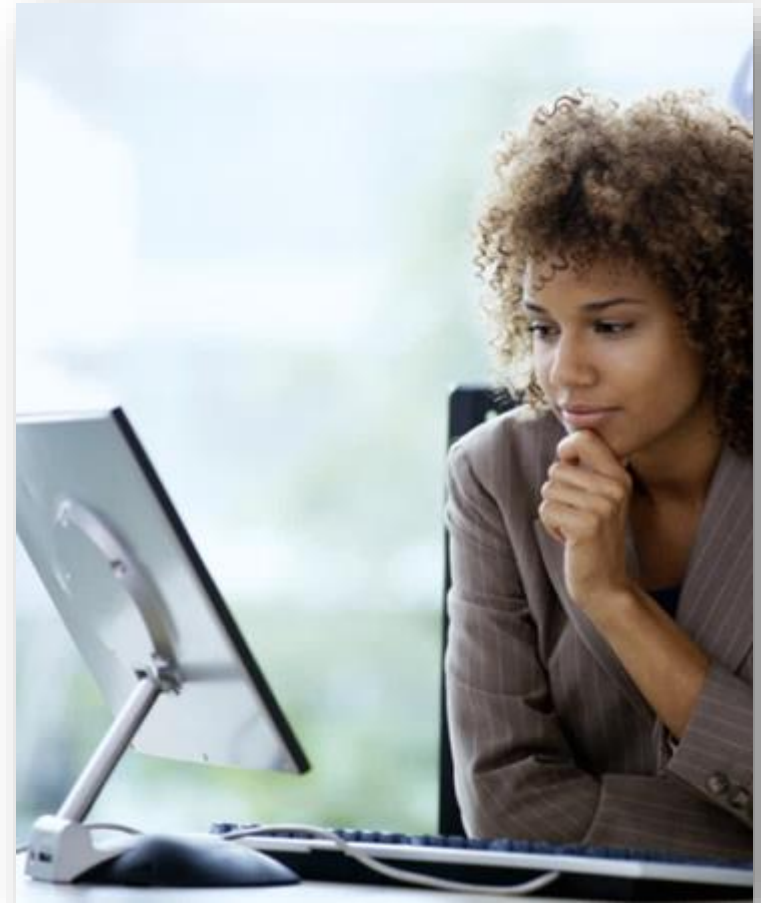## Characteristic analysis: Revolving balance ($) – all trades*

Bad	Good
	0
	1 - 500
	501 - 2,500
	2,501 - 5,000
	5,001 +

1.50   1.00   1.50

Good / bad index

* Originations model

Data preparation
Characteristic analysis: Revolving balance ($) – one account*

Bad	Good	
		0
		1 - 200
		201 - 1,000
		1,001 - 2,000
		2,001 +

1.50   1.00   1.50

Good / bad index

* Behavioral line management model for a store credit card

Data preparation

- Data extraction

- Standard data integrity checks and multi-dimensional EDA

  - ▶ Portfolio reports

  - ▶ Population Stability Index (PSI)

  - ▶ Characteristic analysis

- Waterfall statistics

- Sample selection

| Project inception | **Data prep** | Inference | Segmentation | Model development | Documentation | Implementation |

Data preparation
Roadblocks and potential risks

DETOUR **Progress impeded**

- Lack of specifications for data extraction

- Insufficient attention given to EDA

CAUTION **Potential risks**

- Lack of sufficient attribute vetting

- Delaying extraction and preparation of out-of-time validation sample

Best-in-class | On time | Seamless

Inference

- Assess the need for inference

- Determine appropriate technique

- Evaluate impact on booked population performance

Project inception	Data pr...	**Inference**	Segmentation	Model development	Documentation	Implementation

To correct for sample bias

Example:

| Score | 640 cut-off | Approved applications | ⎫ Modeled population |
| | | Declined applications | ⎬ Application population |
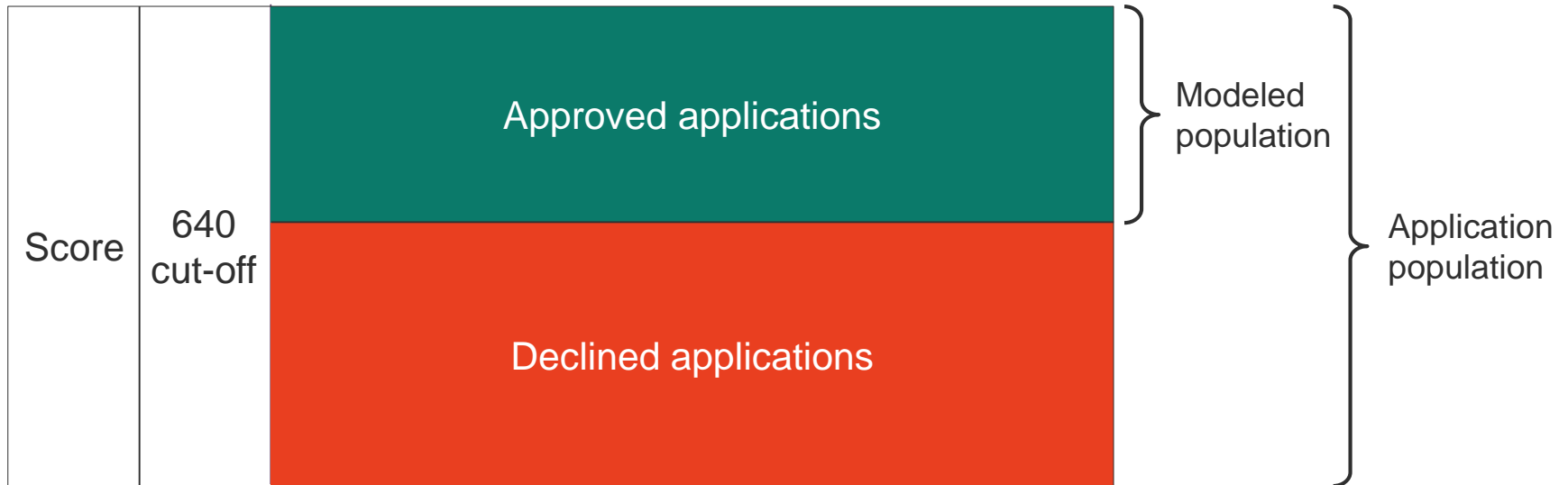
Without inference on declined applications the scorecard would only be valid for a small proportion of the application universe

Inference
Inference techniques
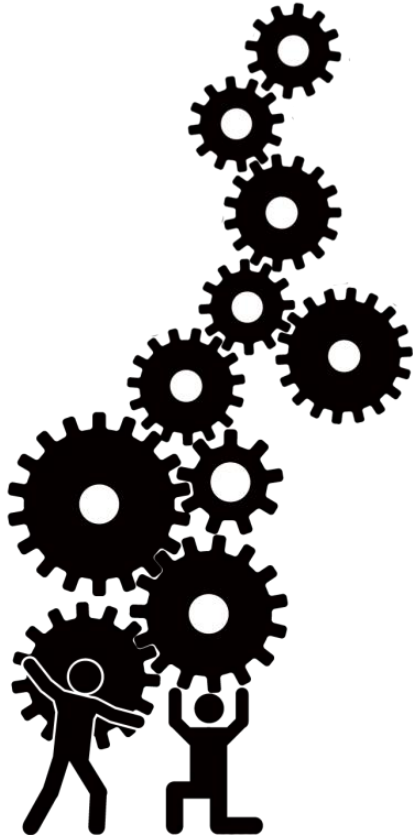
Re-weighting

- Based on a score interval, "weight-up" accounts with known performance to the through the door distribution

Reclassification

- High risk applications, typically based on a score or high risk profile, are assigned a "bad" performance

Parcelling

- Rejected applications are assigned good and bad performance based on a risk score

Bureau inference

- Using bureau data assign good and bad performance based on performance of similar trades with other creditors

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Inference
Impact on booked performance
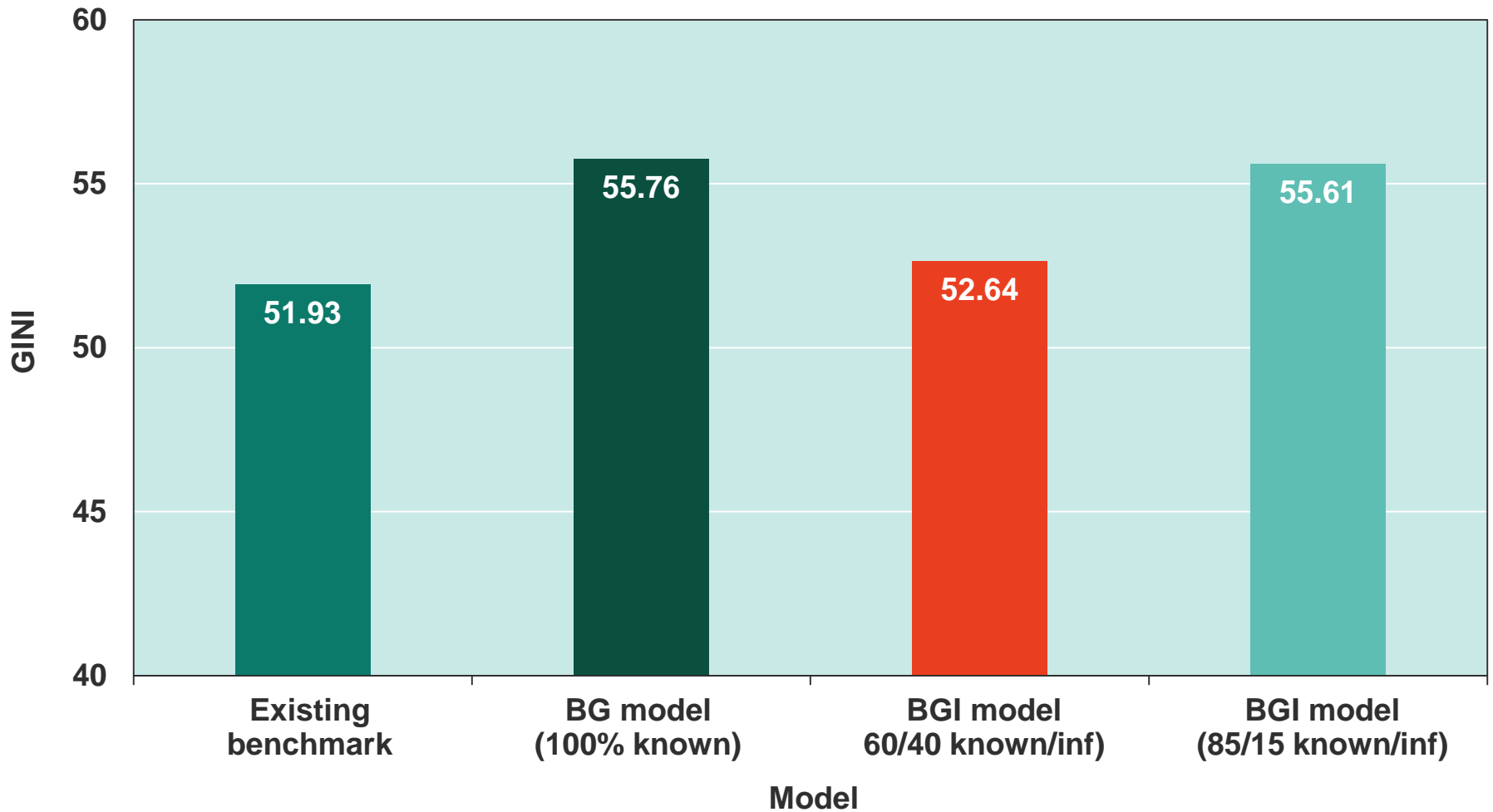
Inference
Roadblocks and potential risks

Progress impeded

- Gaps in sample design and data preparation

- Overcomplicating the inference design

Potential risks

- Too little inference may increase risk exposure

- Too much inference compromises performance of traditional book of business

Best-in-class   On time   Seamless

Segmentation

- Determine candidate schemes

- Build master model

- Build out niche models for each candidate scheme

- Compare master vs. niche model performance

- Assess trade-offs of candidate schemes

| Project inception | Data prep | Inference | **Segmentation** | Model development | Documentation | Implementation |

Segmentation
Segment evaluation
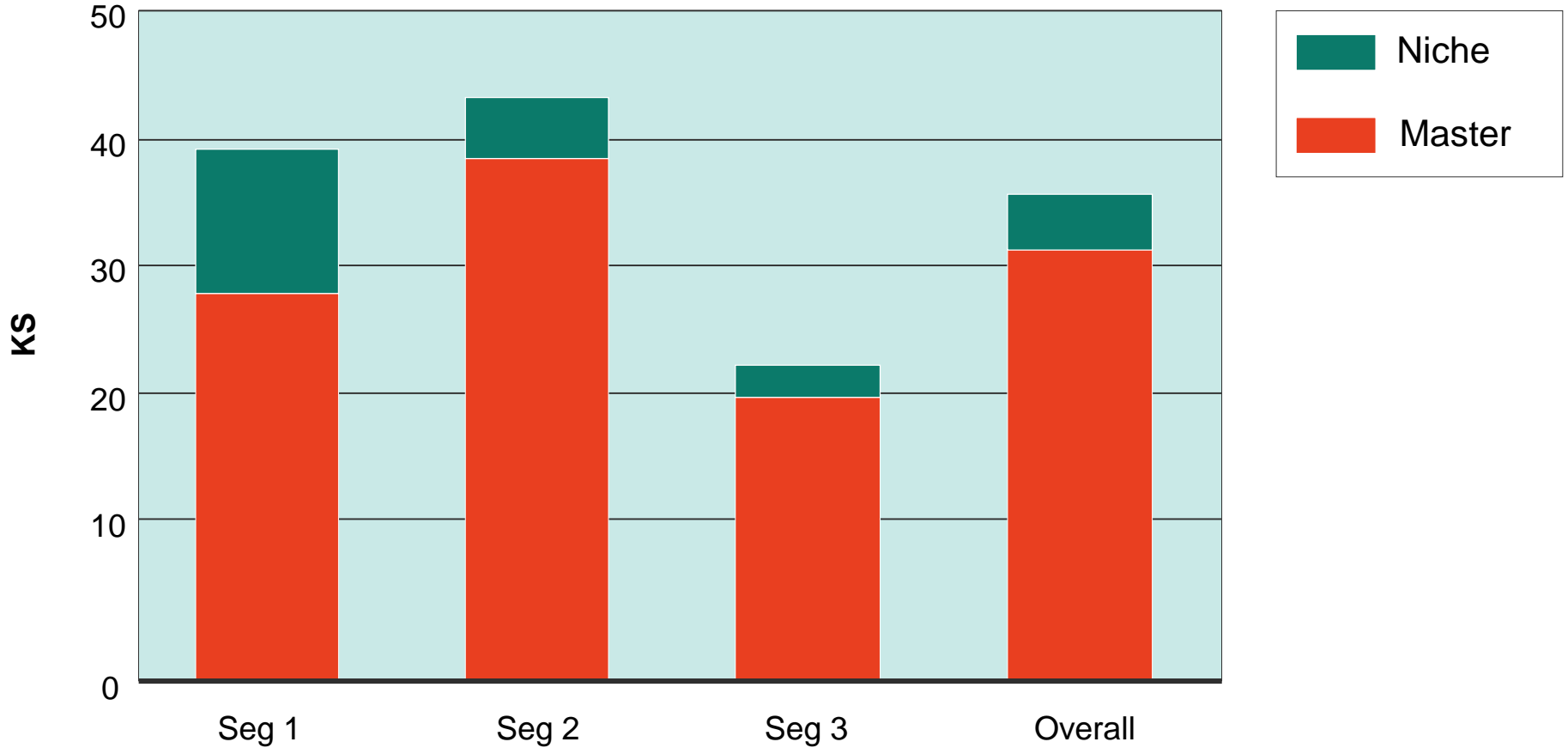
Segmentation
Roadblocks and potential risks

DETOUR **Progress impeded**

- Lack of attribute vetting during project initiation
- Potential segment schemes omitted from consideration

CAUTION **Potential risks**

- Segmentation overkill
- Failure to review simple statistics to help eliminate non-viable segments

Best-in-class	On time	Seamless

Model development

- Finalize attribute selection and modeling approach

- Develop preliminary models

- Conduct stakeholder review, and test alternate attributes

- Refine and finalize models

- For each iteration

  ▶ Test model vs. benchmarks

  ▶ Conduct in- and out-of-time validations
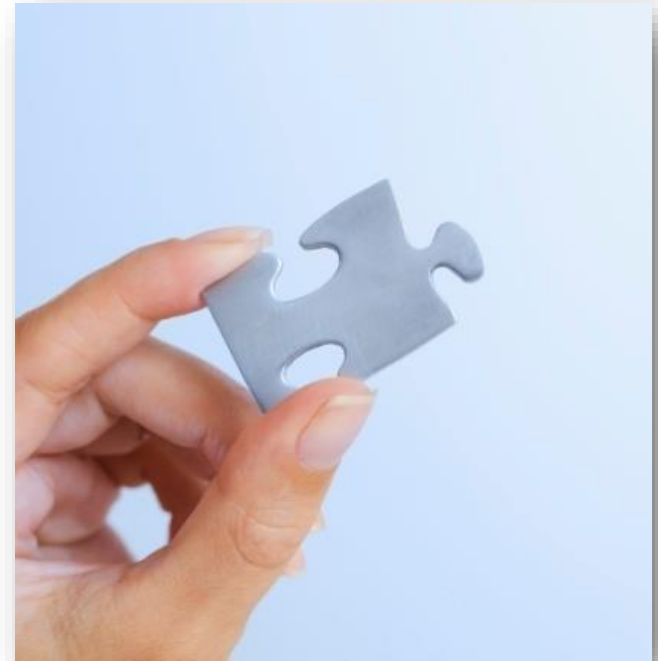
| Project inception | Data prep | Inference | Segmentation | **Model development** | cumentation | Implementation |

Model development
Roadblocks and potential risks

Progress impeded

- Lack of stakeholder sign-off on all prior phases
- Insufficient stratification of estimation and in-sample validation samples during data preparation

Potential risks

- Insufficient attribute vetting
- 'Science' only gets you so far- expert intuition is key
- Delaying out-of-time validations
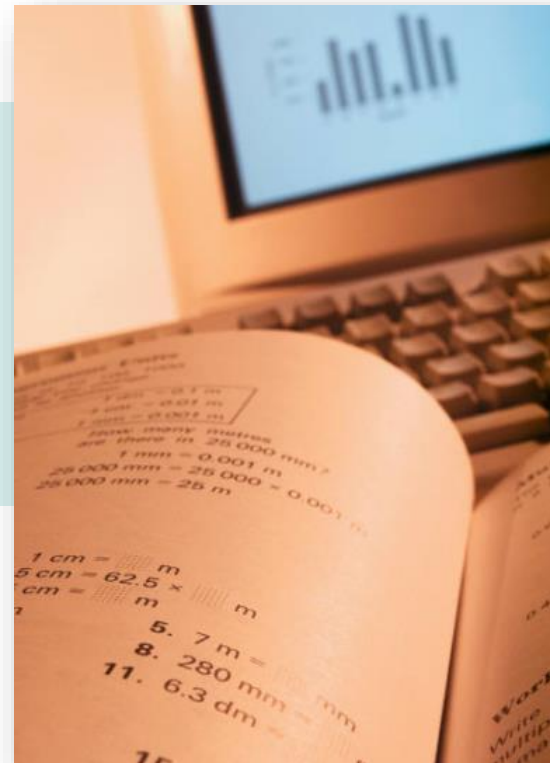
Best-in-class   On time   Seamless

Documentation

- Primary focus on compilation rather than construction

- Compliance and governance

- Document key decisions alongside the rationale

Project inception	Data prep	Inference	Segmentation	Model development	**Documentation**	plementation

Documentation
Roadblocks and potential risks

Progress impeded

- Decisions made that were not recorded

- Insufficient documentation from prior phases

Potential risks

- Do not delay!

- Avoid large gaps – end to end documents

- Ensure document is tailored to complete audience

Best-in-class	On time	Seamless

Implementation

- Coding / testing / auditing
- Strategy design
- Compliance and governance
- Monitoring

Project inception	Data prep	Inference	Segmentation	Model development	Documentation	**Implementation**

Implementation
Roadblocks and potential risks

Progress impeded

- Unrealistic implementation timeframe
- Key participants not consulted
- System limitations not explored

Potential risks

- Use scorecard for designed purpose
- Monitor regularly
- Do not neglect model maintenance

Best-in-class	On time	Seamless

Rules of the road

- Chose the right partners for the journey

- Use the right fuel

- Plan your route and your milestones

- Look ahead and stay focused

- Maintain a travel log

- Be prepared for the unexpected

BE PREPARED TO STOP		HIGH WATER	Y		FOG AREA	
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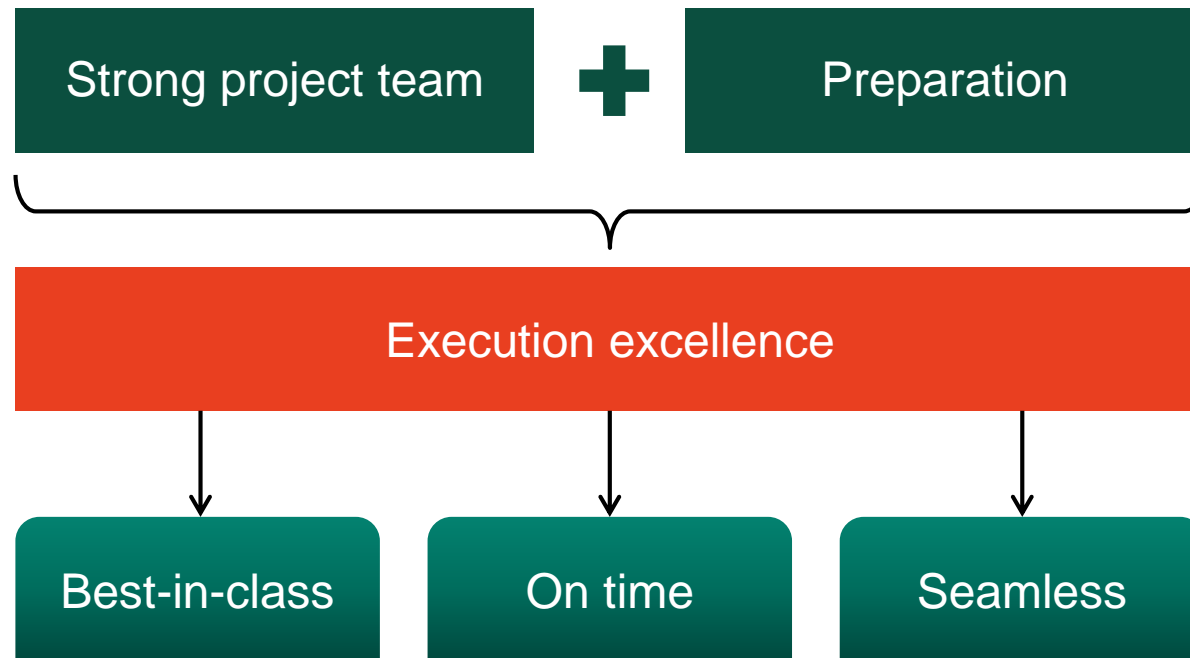
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