Model Maintenance: Hidden Cost of Data Science

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Welcome

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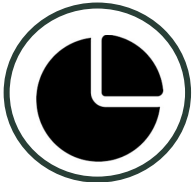# Current State of Data Science

AI skills already exceed the skill level of 80% of people

Machines empirically making better decisions

Less than 5% of companies make effective use of data

90% of high-performance models used extra data…winners are Big Tech

DIY AI is on the rise which results in increased compliance risk maintenance costs

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Demand for Data Science is High

AI regulations are increasing globally

18x

EU, UK, and US have passed the most laws since 2016

Investment in AI continues to soar on an annual basis

2x

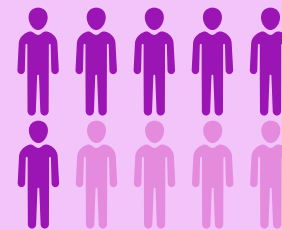Private investments in AI were $94M in 2021, which is more than twice that of 2020

Share of AI jobs in last 5 years

4.5x

AI skills are in high demand

Source: **Stanford AI100**

Growth in AI startups since 2000

14x

Startups are starting to fill gaps in the market

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Challenges

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But Significant Challenges Exist

Talent Gap

- Data Scientists' demand outstrips supply
- High attrition in internal data science teams
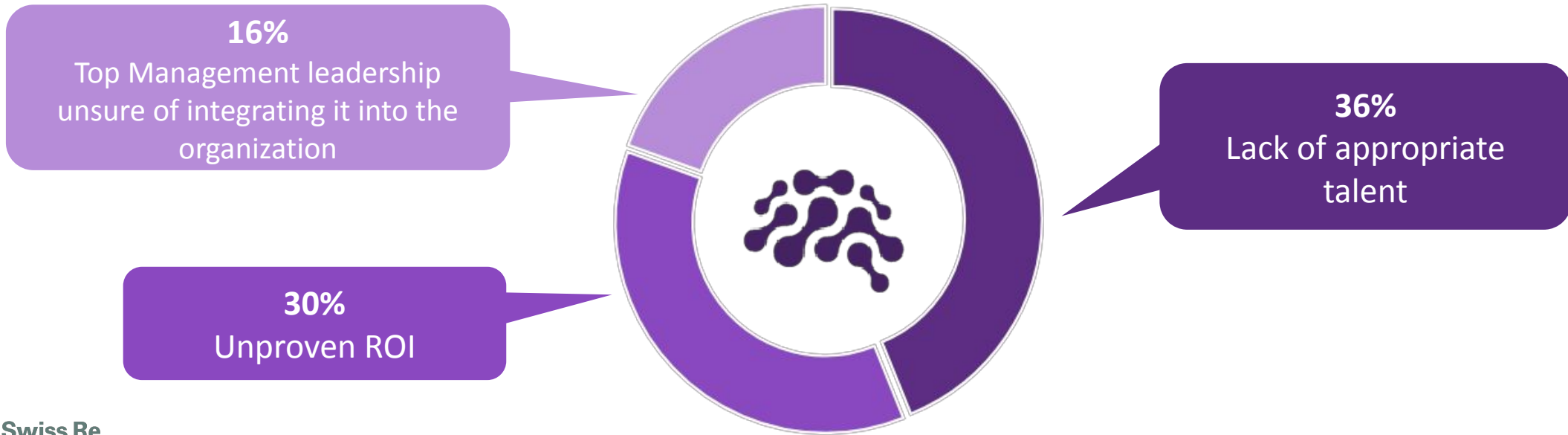- Lack of business knowledge among data science teams

Institutional Gap

- Fast evolving data science infrastructure
- Low ROI: Organizations lack maturity to build deployable models
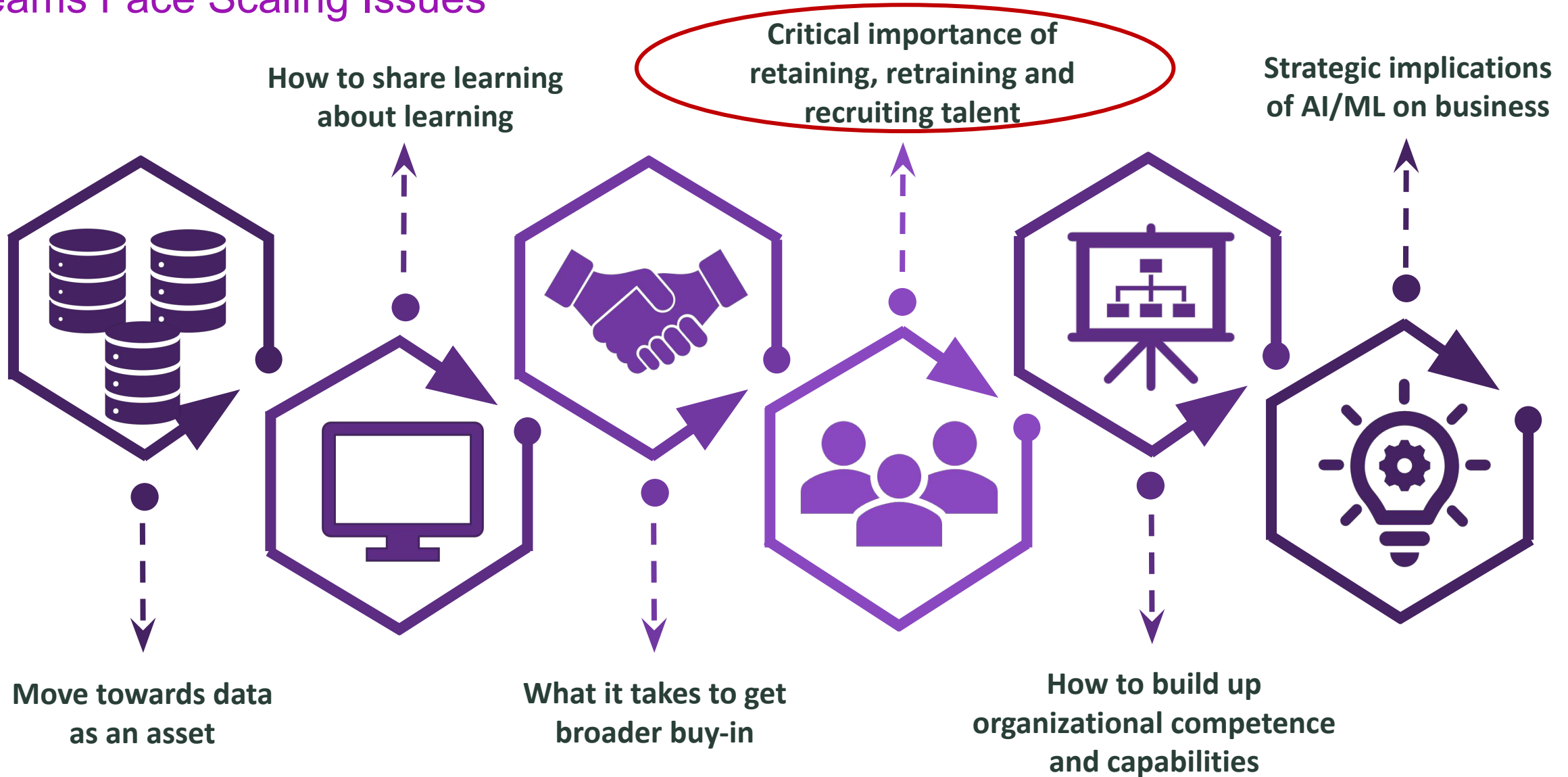- Change Management Programs

Resource Constraints

- Limited budget for data science
- Cloud platforms require constant monitoring to avoid cost overruns
- Underestimation of maintenance costs

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Deployment Failure Rate is Very High

Deciding the appropriate use of AI → **Identifying, hiring, and retaining staff** → **Integrating AI in Business Processes**

16%
Top Management leadership unsure of integrating it into the organization

36%
Lack of appropriate talent

30%
Unproven ROI

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Teams Face Scaling Issues

How to share learning about learning

Critical importance of retaining, retraining and recruiting talent

Strategic implications of AI/ML on business

Move towards data as an asset

What it takes to get broader buy-in

How to build up organizational competence and capabilities

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Total Cost of Ownership

Total Cost of Ownership is High

Identifying the business opportunity

Putting together a team

Budgeting

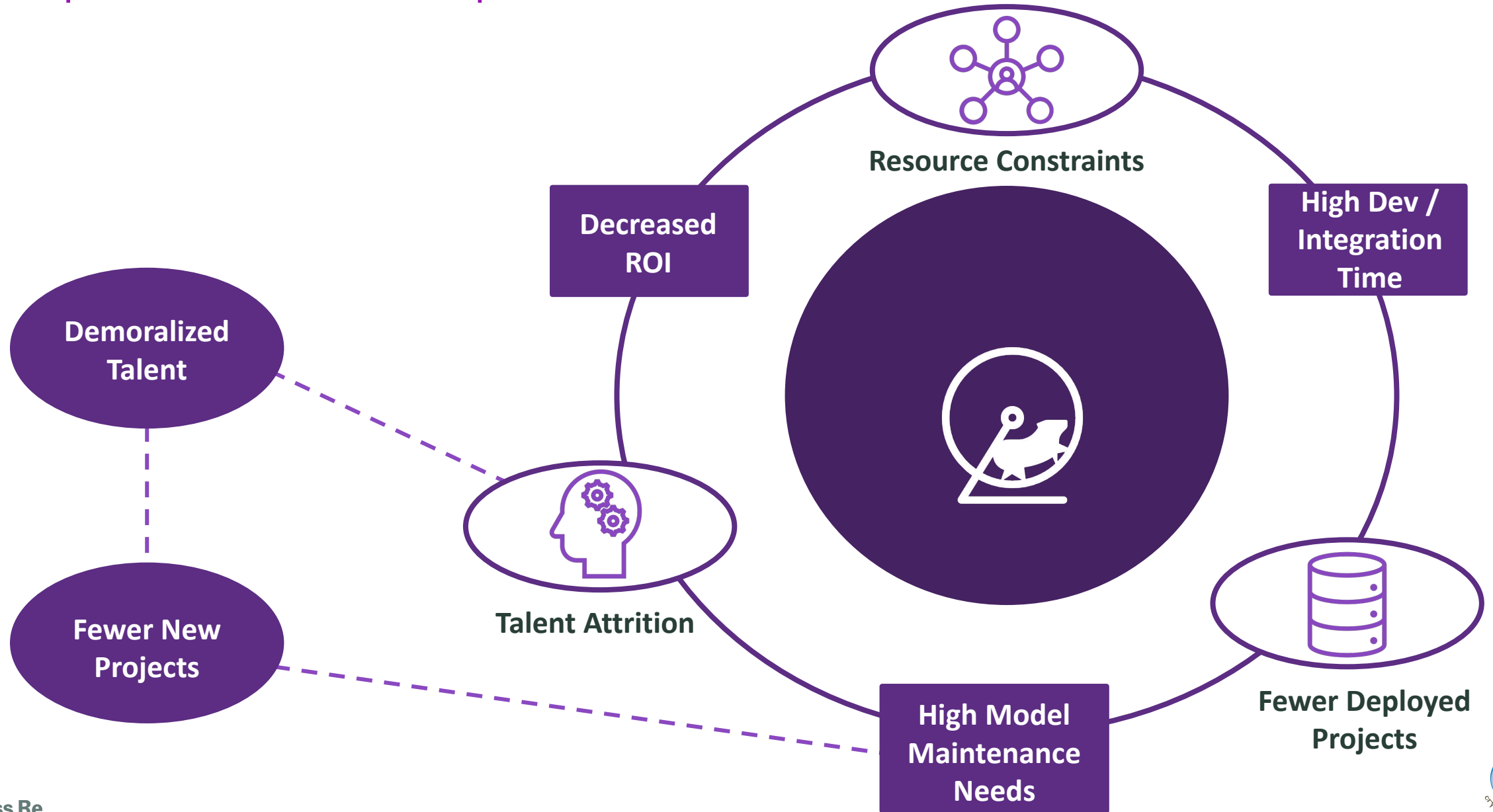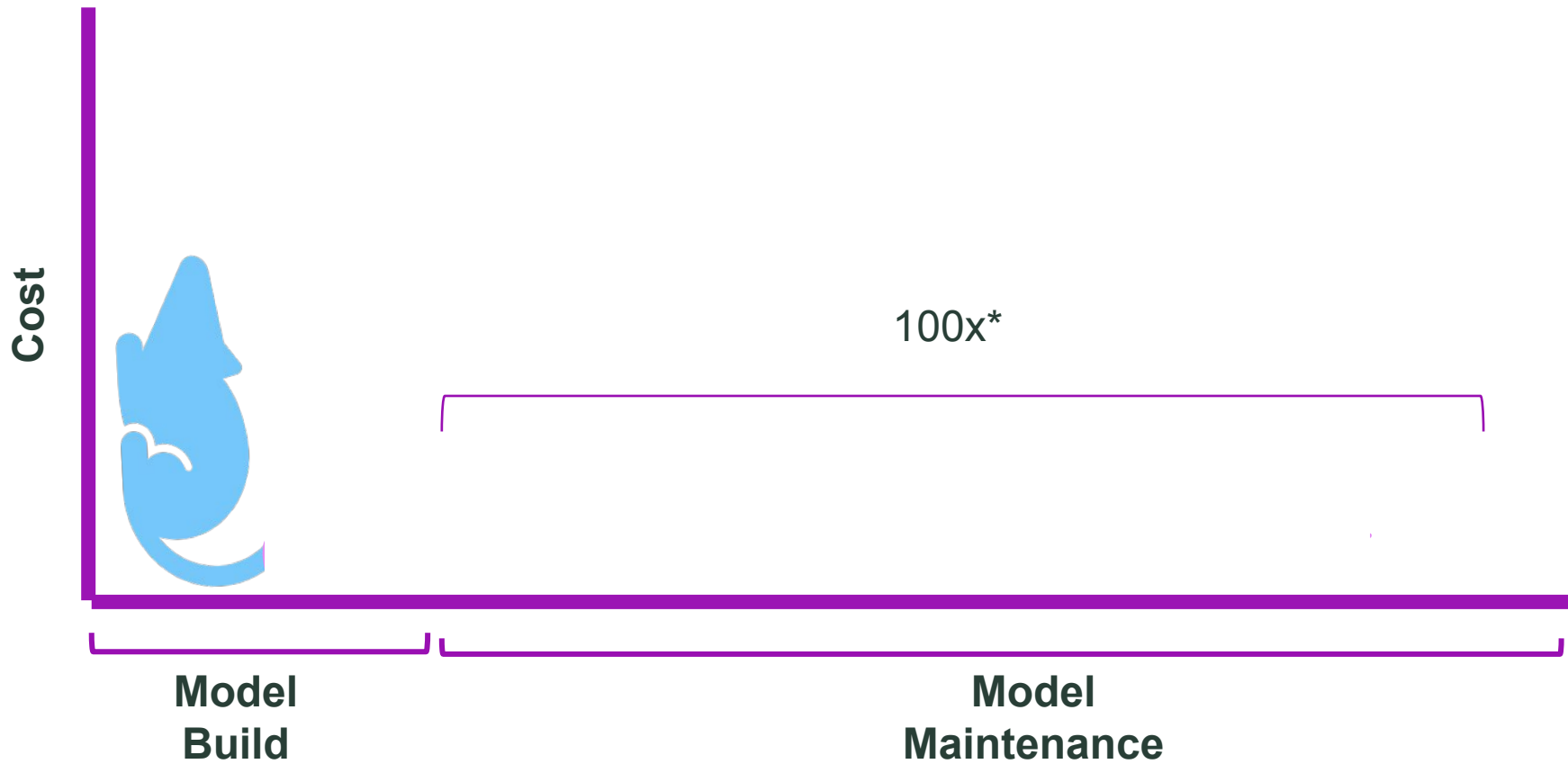Data engineering

Training the model

Testing

Deployment

Maintenance

Death Spiral of Chronic Underperformance

Resource Constraints

Decreased ROI

High Dev / Integration Time

Demoralized Talent

Talent Attrition

Fewer New Projects

High Model Maintenance Needs

Fewer Deployed Projects

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There Is A Need To Manage The Long Tail

Cost

100x*

Model
Build

Model
Maintenance

*Source: Getting Serious About Data and Data Science, Redman & Davenport; MIT Sloan Review, Sep 2020

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MLOps Service

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MLOps as a Service

- Provide Managed Services on deployed Data Science Models

- Includes DataOps, ModelOps, and "software code + infrastructure"

- Monthly Managed Services model

- Single point of contact for services needs

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MLOps as a Service – Framework

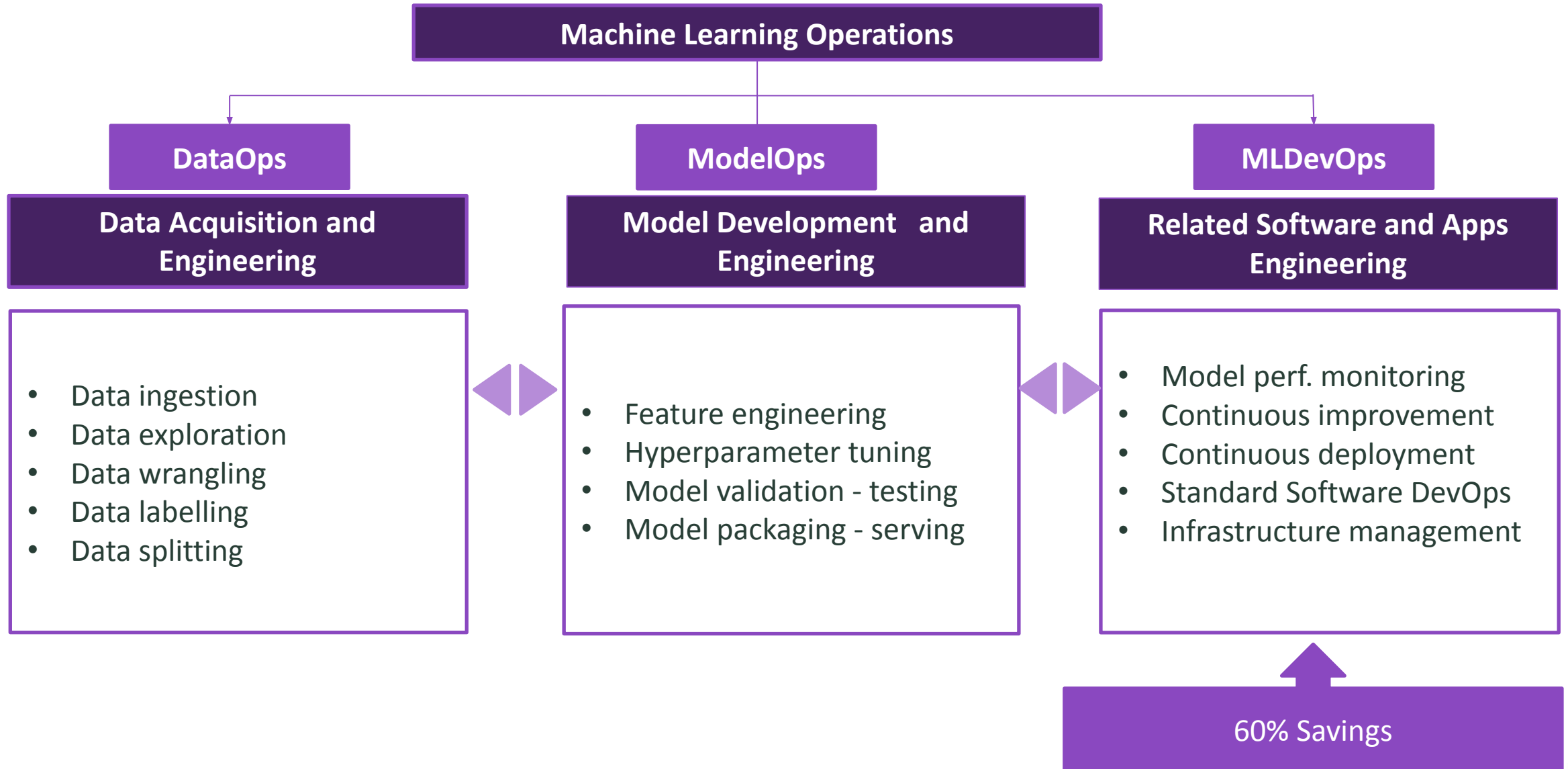| People	Process	Technology
• Data Science professionals assigned to monitor and maintain the model	• Establish accuracy thresholds • Tune models once the accuracy drops below threshold	• Dashboard to monitor model performance

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MLOps as a Service

Machine Learning Operations

DataOps	ModelOps	MLDevOps
Data Acquisition and Engineering	**Model Development and Engineering**	**Related Software and Apps Engineering**

DataOps — Data Acquisition and Engineering

- Data ingestion
- Data exploration
- Data wrangling
- Data labelling
- Data splitting

ModelOps — Model Development and Engineering

- Feature engineering
- Hyperparameter tuning
- Model validation - testing
- Model packaging - serving

MLDevOps — Related Software and Apps Engineering

- Model perf. monitoring
- Continuous improvement
- Continuous deployment
- Standard Software DevOps
- Infrastructure management

60% Savings

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"Based on our experience, a good rule of thumb is that you estimate that for every $1 you spend developing an algorithm, **you must spend $100 to deploy and support it.**"

Tom Davenport
President's Distinguished Professor in Information Technology and Management at Babson College

Any questions?

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Thank you!

Contact us

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