



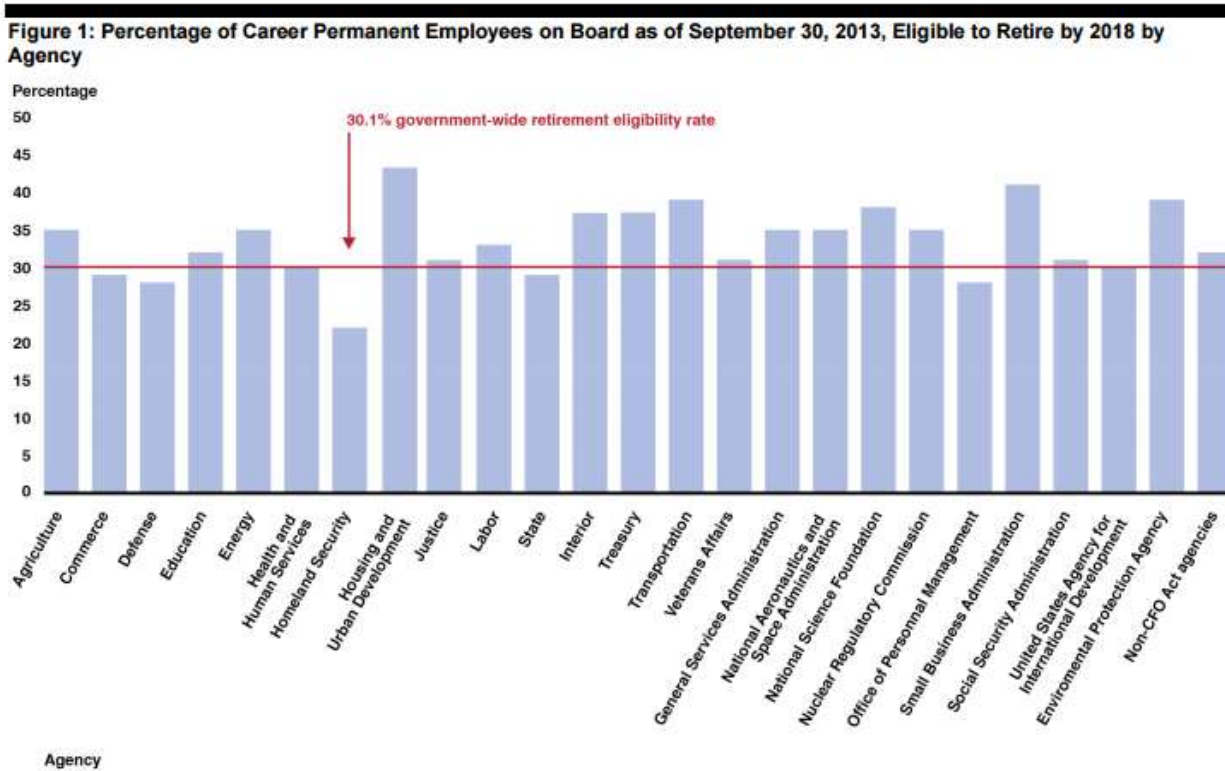
Using Analytics to Change the Workforce

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Principle Industry Consultant, SAS Institute

OneHR - The Future Starts With Us

March 5, 2019



Source: GAO analysis of data from the OPM Enterprise Human Resources Integration Statistical Data Mart. | GAO-15-223

THE BUBBLE IS BURSTING AT THE STATE LEVEL TOO

“...**state governments have older workers than any other sector** and that the mean age of their workforce has risen nearly as much as that of the federal civil service. Thus, the **retirement tsunami may hit states harder than the federal government.**”

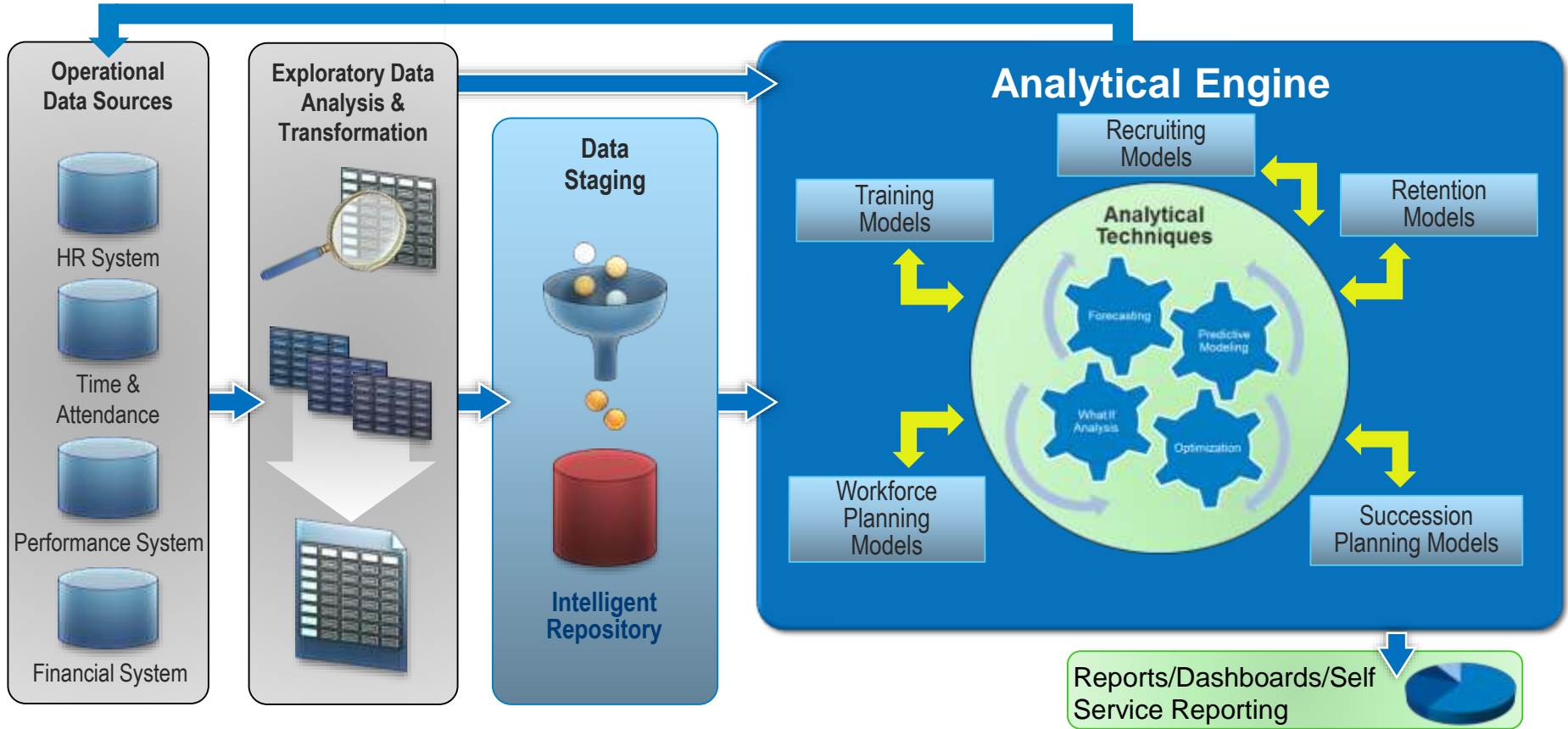


- American Review of Public Administration

Issues	Leading practices	High impact methods	Analytical Technique Employed
Workforce Planning/Readiness	Understand Skillsets/Geographic location based	Develop optimize and forecast models	Forecasting, What If Analysis , Reporting, Risk Scoring
	Insight into Supply and Demand of skillsets	Conduct What If Analysis models	
Recruiting (Risk scoring candidates)/Retention	Understand why, when, how employees behave	Develop Risk Propensity Scores	Risk Scoring, Predictive Modeling, Forecasting, What If Analysis
		Define Key leading indicators	
		Predict Employee Behavior	
Cost of Workforce	Understand cost per employee	Define Cost models for granularity	Cost Modeling, Forecasting, What If Analysis
	Understand cost based on program requirements	Develop Cost correlation models	
Succession Planning	Balance of mix portfolio of skillsets	Optimize work force portfolio	Correlation, Forecasting, What If Analysis, Optimization
	Balance of experience and tenure	Develop forecast models employee churn	
	Funnel of staff to growth and promotions	Implement training curriculum for growth	
Training	Understand Training Requirements	Define Training Requirements	Predictive Analytics, Optimization, Forecasting
	Develop Training Path Across the Enterprise	Optimize Training Across the Enterprise	

WORKFORCE ANALYTICS

HOW WE DO IT



Special Forces Command (SOCOM)

SOCOM risk scores training candidates to determine if the candidates have the qualities needed to graduate the training program before SOCOM makes the \$100k investment in the candidate

US Air Force Personnel Center

The US Air Force relies on SAS for instant, worldwide access to personnel demographics -- saving hours, sometimes days, in responding to requests for information.

Army Human Resources Command

Using SAS, the Army HRC can optimize the way incentives are offered to re-enlisting soldiers so that it could maximize its re-enlistment spend and keep up with retention goals.

SAS

Using our own analytics on our own staff, SAS has ranked in the Top 3 on Fortunes Best Employers list 5 of the last 8 years. Yes – we eat our own dog food!



WORKFORCE MANAGEMENT

DEMO



Workforce Simulation Report



Select an Agency

Select a Sub Agency

Agency Name

Sub-Agency Name

Employment Dashboard

Separations Dashboard

Separation Types

Employee Turnover

Correlation Matrix

Heat Map

Decision Tree

Forecast

Employment Dashboard

This dashboard gives an employment overview by agency. It is broken down by subagency, age level, and occupation.

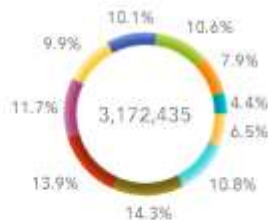
Number of Employees by Sub Agency

Number of Employees



Employees by Age Level

Age Level



Occupation Family	Number of Employees	Salary	Length of Service	Ri
03xx-GENERAL ADMIN, CLERICAL, & OFFICE SVCS	551,913	\$70,992	12.8	
06xx-MEDICAL, HOSPITAL, DENTAL & PUB	428,042	\$82,083	9.4	
18xx-INVESTIGATION	255,558	\$73,141	12.2	
08xx-ENGINEERING AND	177,296	\$96,412	16.2	

Workforce Simulation Report



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Sub-Agency Name

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Separations Dashboard

This dashboard gives a separations overview by agency. It is broken down by time period, subagency, and occupation

Death

Other Separation

Quit

Reduction In Force (RIF)

Retirement

Termination

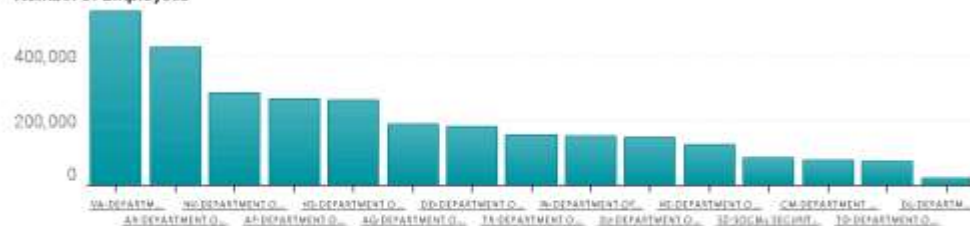
Transfer Out

Number of Employees by Period



Separations by Sub Agency

Number of Employees



Separations by Occupation

Occupation Family

Occupation Family	Number of Employees	Percent of Employees
03xx-GENERAL ADMIN, CLERICAL, & OFFICE SVCS	551,913	23.59%
06xx-MEDICAL, HOSPITAL, DENTAL & PUB HEALTH	428,042	18.30%
18xx-INVESTIGATION	255,558	10.92%
08xx-ENGINEERING AND ARCHITECTURE	177,296	7.58%

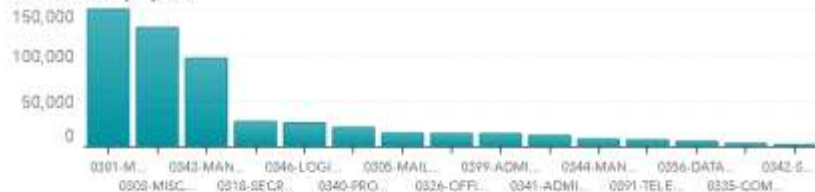
Double Click on an occupation above to get a better understanding of who is leaving

Separations Profile



Employee Separations by Occupation

Number of Employees



Education Level

Education Level	Number of Empl...	Percent Employ
04-HIGH SCHOOL GRADUATE OR CERTIFICATE OF EQUIVALENCY	91,040	28
13-BACHELOR'S DEGREE	75,508	23
17-MASTER'S DEGREE	53,611	16
10-ASSOCIATE DEGREE	20,646	6
07-SOME COLLEGE - LESS THAN ONE YEAR	18,326	5
08-ONE YEAR COLLEGE	12,868	4
09-TWO YEARS COLLEGE	11,828	3

Separations by State



Employee Separation Types



Close

Workforce Simulation Report



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Sub-Agency Name

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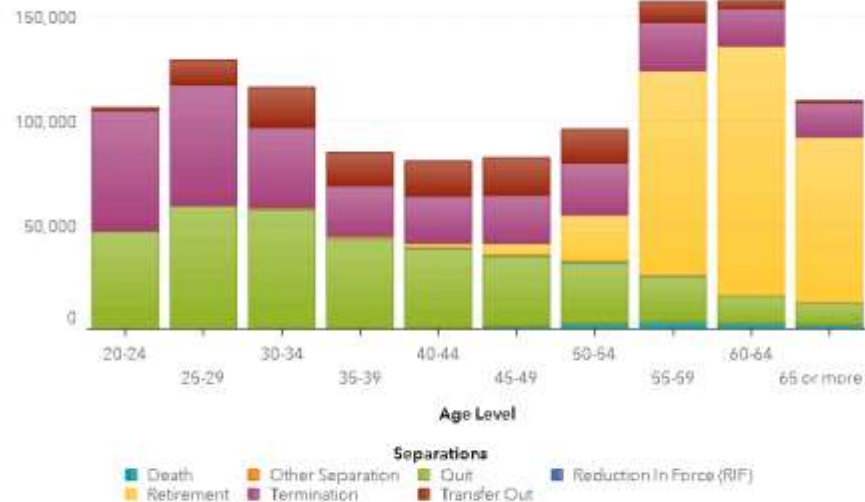
Forecast

Separation Types

This dashboard gives a breakdown of separation types by age group. You can also see separations by occupation and gender.

Separation Types by Age Level

Frequency



Separations and Length of Service by Sub Agency



Separations by Gender

Frequency



Workforce Simulation Report



Select an Agency

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Sub-Agency Name

Employment Dashboard

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Employee Turnover

This dashboard gives a breakdown of turnover probability by age group, occupation, and state. You are also able to profile certain individuals.

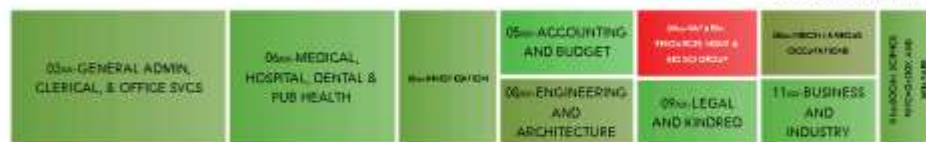
Turnover Probability by Age Level

Turnover Probability



Turnover Probability by Occupation

Occupation Family



Number of Employees ■ Turnover Probability

Turnover Probability by State



Number of Employees ■ Turnover Probability

... Loading...

WORKFORCE ANALYTICS

CORRELATION ANALYSIS



Workforce Simulation Report



Select an Agency

Select a Sub Agency

Agency Name

Sub-Agency Name

Employment Dashboard

Separations Dashboard

Separation Types

Employee Turnover

Correlation Matrix

Heat Map

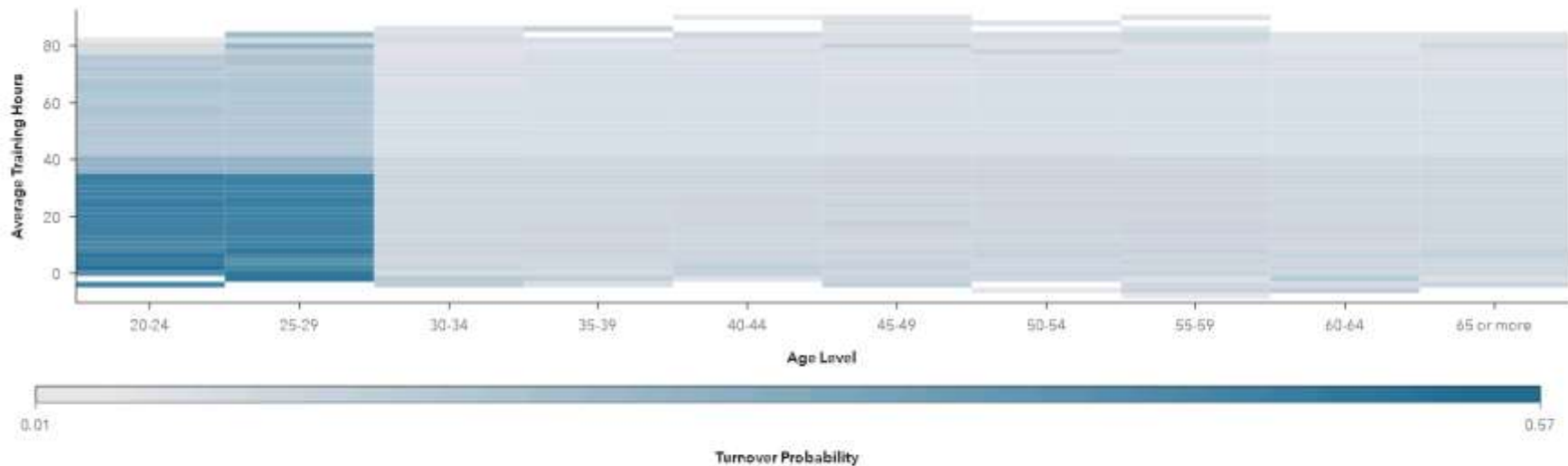
Decision Tree

Forecast

Turnover Probability Heat Map

The heat map shows the Turnover Probability of employees by Age Level and Average Training Hours.

Turnover Probability by Age Level, Average Training Hours



Select an Agency

Select a Sub Agency

Agency Name ▼

Sub-Agency Name ▼

Employment Dashboard

Separations Dashboard

Separation Types

Employee Turnover

Correlation Matrix

Heat Map

Decision Tree

Forecast

Employee Separations Decision Tree

The decision tree below shows whether or not an employee left the organization with Average Training Hours as a predictor.

Tree

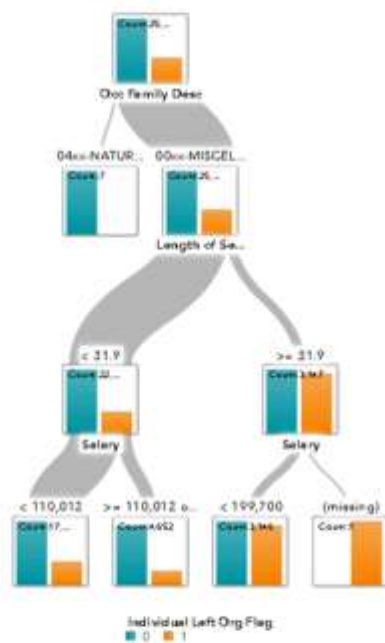


Tree Ice Plot Variable Importance Assessment

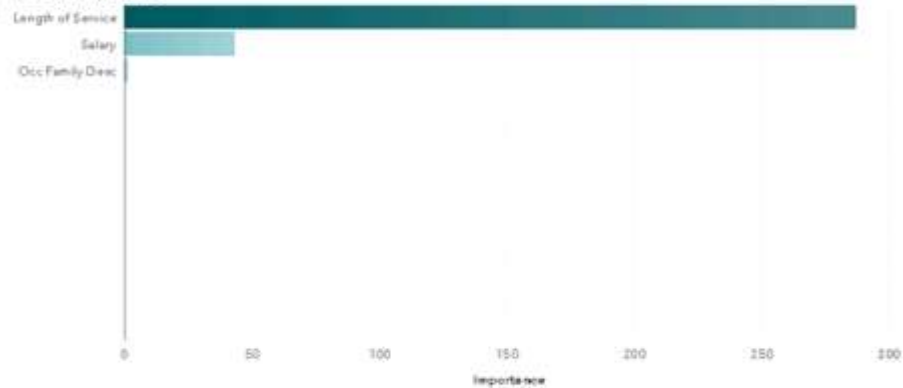
DL DEPARTMENT OF LABOR

Decision Tree Individual Left Org Flag (events=1) K5(Youden) 0.1206 Observations Used 25,671

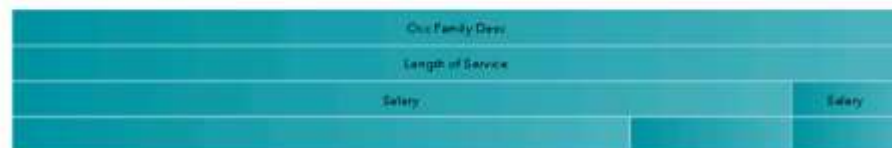
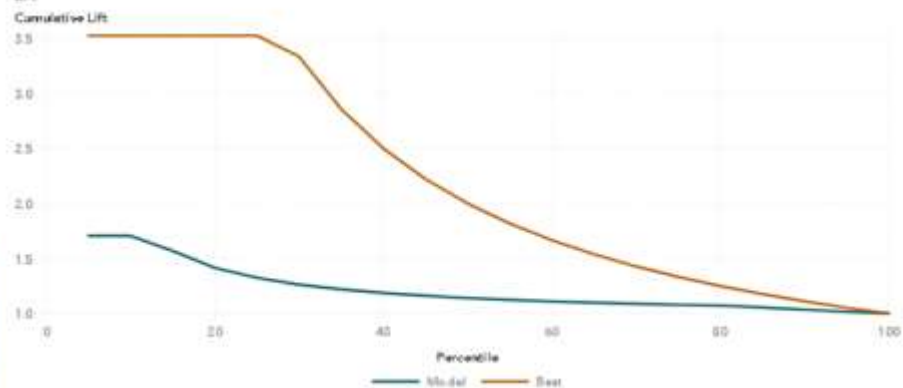
Tree



Variable Importance



Lift



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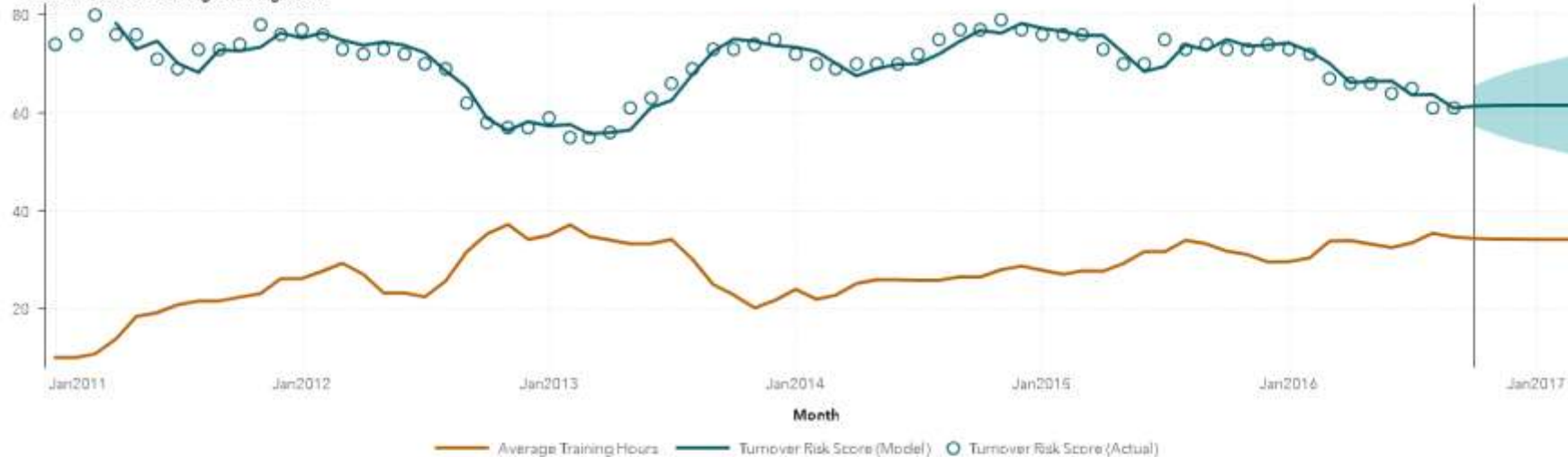
Correlation Matrix

Heat Map

Decision Tree

Forecast

Turnover Risk Score / Average Training Hours



About this forecast

- 95% forecast confidence.
- The forecast for Turnover Risk Score has the following contributing factor(s): Average Training Hours

Workforce Simulation Report

Select an Agency

Select a Sub-Agency

Data Roles

What-If Analysis

Chart Table

Turnover Risk Score / Average Training Hours



Select the type of analysis @

 Goal Seeking Scenario Analysis

Apply

Cancel

About this forecast

- 95% forecast confidence.
- The forecast for Turnover Risk Score has the following contributing fac

Forecast algorithms

Close

Workforce Simulation Report

Select an Agency

Agency Name

Select a Sub Agency

Sub-Agency Name

Compositions Profile

Separation Types

Employee Turnover

Correlation Matrix

Heat Map

Decision Tree

Forecast

Turnover Risk Score / Average Training Hours



About this forecast

- 95% forecast confidence
- The forecast for Turnover Risk Score has the following contributing factor(s): Average Training Hours

Data Roles

Forecasting 1

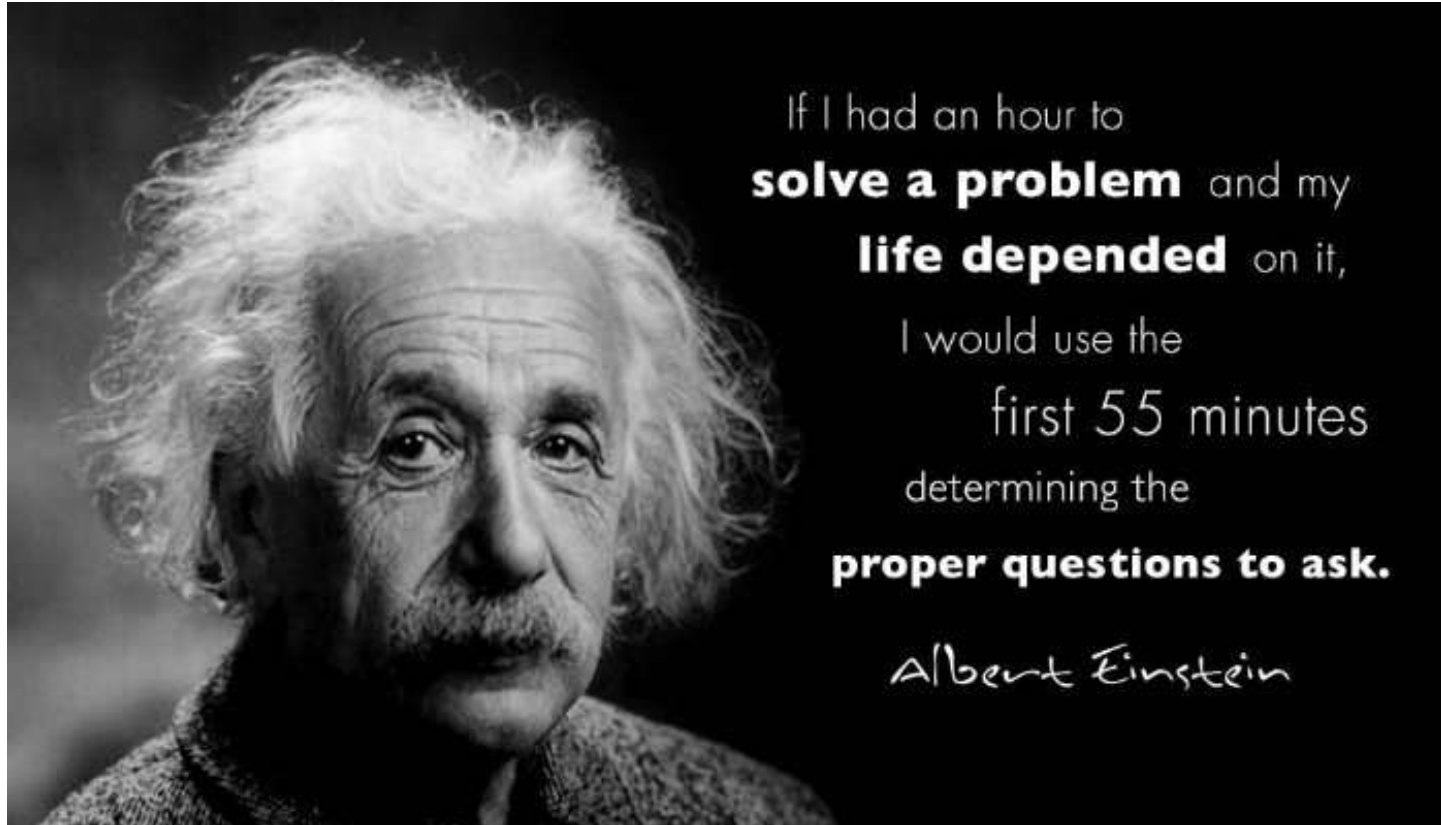
Time axis

Measure

Forecast

What if...

Underlying factors



If I had an hour to
solve a problem and my
life depended on it,
I would use the
first 55 minutes
determining the
proper questions to ask.

Albert Einstein