

Question

What types of Predictive Analytics are being used in Talent Management Organizations? Are there best practices specifically in the areas of high-potential identification and executive succession planning?

Introduction

Talent management organizations are increasingly deriving insights from data to make better decisions. Their use of data analytics is advancing from *descriptive* to *predictive* and *prescriptive* analytics. *Descriptive* analytics is the most basic form, providing the hindsight view of what happened and laying the foundation for turning data into information. More advanced uses are *predictive* (advanced forecasts and the ability to model future results) and *prescriptive* (“the top-tier of analytics that leverage machine learning techniques ... to both interpret data and recommend actions”) analytics (1). Appendix A illustrates these differences. This report summarizes our most relevant findings about how both academic researchers and HR practitioners are successfully using data analytics to inform decision-making in workforce issues, with a focus on executive assessment and selection.

Use of Analytics for: Assessing Executive Performance

It is no secret that the use of traditional performance appraisal systems for executive positions foster little confidence. Nonetheless, the following studies have found verifiable results by using data analytics to assess employee and executive performance.

Using Goal Orientation to Assess Performance: Academic research has shown that employee performance can be predicted by the analysis of *employee goal orientation*, of which three kinds have been identified. These are *learning-orientation* (in which employees are driven to improve their own skills and competencies independent of external pressures), *performance-prove* (in which an employee uses a situation to display his/her accumulated skills) and *performance-avoid* (in which an employee reacts to avoid consequence). **Although employees exhibit features of several orientations, research that used predictive analytics found that employees’ learning and performance-prove orientations that could most accurately predict success.** These studies developed a model that combines demographic employee data, predictor variables (such as goal-orientation), and mediating variables (such as proactive behavior and emotional control/intelligence) to assess employees for future performance (2). Considering the amount of cross-functional interaction and emotional intelligence that is required for executives, this could prove an invaluable predictive metric for assessing their performance. See Appendix B for a table of the results of their collected data.

Executive Competency Modeling with Data Analytics: Organizations struggle to find research-based competency models that accurately predict performance at the executive level. An authoritative analytical research study used predictive analytics to assess vital competencies and link them with performance rates (3). This was done by separating managerial traits into two groups: *resource-problem solving oriented* (e.g. financial analysis) and *people-oriented* (e.g. staffing and customer interaction). **The research found that the former group was key in predicting initial performance while the latter group was a more accurate predictor of future performance trends.** So strong was this correlation, that the researchers felt that using this model could lead to ‘a minimum expectation of \$3 million in additional profits per year per candidate selected using the procedure’ (3). Appendix C and D show an analysis of the model in terms of profits and sales and the definitions of the managerial dimensions examined in the study..

Predicting Performance through Individual Assessments: Individual assessments are often used for predicting job performance. However, it has been found that not all components are useful for managerial roles. A study concluded that certain factors could more accurately predict performance (4). The three key groups of factors they found to be predictive were: ‘*information input*’ (e.g. the use of cognitive ability tests), ‘*information evaluation*’ (e.g. the standardization of assessments) and ‘*information output*’ (e.g. the source of recommendation, which is when the decision is directly made by the assessor or as a result of an assessment report). **They found that cognitive ability and prior experience in roles could positively predict subsequent performance and improve of the selection decisions** (4). Appendix E shows the specific predictive variables that they used.

Predicting Performance through Job Development Quality: Organizations typically look to an employee’s past performance trends and acquired skills (“end-state competencies”) to predict future performance. Several studies (5,6,7), however, show strong evidence for using a candidate’s current and past job *development quality* (the value of a job in creating or improving skills for future roles) to more effectively predict performance and identify successors. This is a difficult practice considering most systems of assessment do not measure this quality in jobs. A few tools that utilize data have been developed to measure a job’s development quality to fill this gap.

One study uses a statistical tool called a **Development Challenge Profile** to study the development quality of different jobs. It uses dimensions such as *job transition*, *change creation*, *level of responsibility* and *cross-functional cooperation* (see Appendix F for descriptions of the different dimensions) (6).

Another statistical tool (named “**Prospector**”) uses results from questionnaires that are administered to managers in order to produce a list of competencies that show accuracy in predicting performance. See Appendix G for examples of scale items used in the Prospector tool. The researchers concluded that there is a specific set of both *end-state competencies* (e.g. business knowledge, risk-taking, cultural sensitivity) and *learning-oriented practices* (e.g. flexibility, use of feedback, and response to criticism) that can help identify future leaders (7).

Other Uses & Best Practices

Global Mobility: Most companies only measure global mobility assignments from a cost and efficiency standpoint. Deloitte has shown that much more insight can be gained from global mobility initiatives’ effectiveness and strategic alignment with the use of analytics. Appendix H offers a framework for how to do this. It provides an example of how analytics can provide hindsight, insight, and foresight for six types of measures (process, financial, operational, service, talent, and business). For example, talent analytics can enable you to look at retention two years after the end of an assignment, in addition to knowing if individuals are still high-potential leadership candidates (hindsight). Even better, though, analytics can help you provide improved career planning by understanding which roles and promotion opportunities would be best for specific employees post-assignment and determine which attributes make an assignment successful (8).

Workforce Planning: Analytics can also be used to gain insight into how talent flows in and out of the organization, the specific changes in management practices and market conditions that affect these flows, and the steps needed to address workforce planning gaps. We found three key components that facilitate this process from an analytics standpoint:

1. *Collect and analyze employee data* (hindsight) to thoroughly understand your organization’s internal market and employee transactions over time, including attraction, hiring, development, promotion, and retention. This will help establish a platform for workforce forecasting. Appendix I shows the data collection and analysis process that an aerospace supplier used to diagnose problems in their internal labor market and recruit for a new order.
2. *Forecast the supply and demand* (insight) of key occupations that drive your organization’s core strategy. This will help you know how many employees with specific skills will be needed in the future, where and when they will be needed, and if the supply will meet your needs. Appendix I provides a case study of the forecasting model that a healthcare provider developed to more realistically forecast supply and demand.
3. Use *predictive analytics* (foresight) to make educated predictions in areas like performance, based on past behaviors and trends. Appendix I offers a case study of the use of predictive analytics to identify critical behaviors of people in leadership roles that can predict success.

As mentioned above, Appendix I provides helpful case studies to realistically show how each of these processes enabled the use of data analytics within talent management organizations (9).

Turnover and Retention: Organizations have created statistical models to understand and predict turnover, allowing managers to more quickly change work conditions to prevent top performer turnover. One organization used employee data (the report did not include exact variables used) from the previous three years to identify which variables were strong predictors of retention and turnover. This analysis informed the development of focused retention strategies. For example, despite an intensely competitive talent market in China, they found that compensation was not the primary driver of turnover. The company was able to focus its investments on the retention initiatives that offered the highest value and impact (1).

Conclusion

Over the course of our research, we found few examples providing specific details, variables and statistical methods being used by organizations. We were, however, able to identify academic research which showed the success of using predictive analytics to improve performance, specifically in the case of executive potential identification. Although studies like the ones outlined above show a powerful use of statistical methods to predict employee behaviors, practitioners should be aware that correlation does not imply causation; thus, companies should incorporate qualitative data and their best judgments responsibly when making decisions using predictive analytics.

Works Cited

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Appendix A
Analytics techniques



Appendix B

Multivariate Regression Analysis for Self-Management Tactics on Learning, Performance-Prove, and Performance-Avoid Goal Orientation (2).

Multivariate Regression Analysis for Self-Management Tactics on Learning, Performance-Prove, and Performance-Avoid Goal Orientation

Variable	β	$F(4, 83)$
Learning goal orientation		
Feedback seeking	.29	2.80
Proactive behavior	.50	16.33***
Emotional control	.29	4.69*
Social competence	.30	4.39*
Performance-prove goal orientation		
Feedback seeking	.39	9.56**
Proactive behavior	.35	4.14*
Emotional control	.21	1.37
Social competence	.27	3.13
Performance-avoid goal orientation		
Feedback seeking	-.14	0.01
Proactive behavior	-.29	1.31
Emotional control	-.11	0.01
Social competence	-.13	0.02

* $p < .05$. ** $p < .01$. *** $p < .001$.

Appendix C

Hierarchical Linear Model Analysis: Conditional Model for Profit and Sales

Hierarchical Linear Model Analysis: Conditional Model for Profit and Sales.

Fixed effect	β		SE β	
	Profit	Sales	Profit	Sales
Model for initial status (π_{0i})				
Intercept (β_{00})	-1.33	-4.61	2.08	3.78
Understanding business (β_{01})	0.98**	1.06**	0.35	0.32
Short-term execution (β_{02})	1.09***	0.88*	0.21	0.41
Climate setting and communications (β_{03})	0.82	0.97	0.67	0.92
Customer interaction (β_{04})	0.45**	0.71	0.17	0.85
Staffing (β_{05})	0.63	0.92	0.54	0.73
Financial analysis (β_{06})	0.59*	0.87**	0.25	0.31
Strategic planning (β_{07})	0.76	0.59	0.79	0.84
Product planning (β_{08})	0.87	0.55	0.79	0.63
Organizational acumen (β_{09})	0.99	0.56	1.07	0.78
Overall rating (β_{010})	1.04**	0.94**	0.30	0.35
Questionnaire (β_{011})	0.09	0.13	0.25	0.22
Model for performance trend (π_{1i})				
Intercept (β_{10})	-8.11	-7.45	8.23	9.38
Understanding business (β_{11})	0.56	0.78	0.61	0.91
Short-term execution (β_{12})	0.12	0.43	0.42	0.39
Climate setting and communications (β_{13})	0.55*	0.67*	0.26	0.30
Customer interaction (β_{14})	0.81*	0.41*	0.36	0.18
Staffing (β_{15})	0.89**	0.78***	0.33	0.09
Financial analysis (β_{16})	0.26	0.45	0.20	0.44
Strategic planning (β_{17})	0.45	0.82	0.38	0.67
Product planning (β_{18})	0.57**	0.68**	0.22	0.23
Organizational acumen (β_{19})	0.80**	0.69*	0.27	0.31
Overall rating (β_{110})	1.20**	1.50**	0.43	0.83
Questionnaire (β_{111})	0.02	0.03	0.12	0.09

Note. $N = 98$.

* $p < .05$, two-tailed. ** $p < .01$, two-tailed. *** $p < .001$, two-tailed.

Appendix D

General Manager Job Dimensions

General Manager Job Dimension Definitions^{A1}

Understanding, analyzing, and setting direction for a business. Finds out what is going on by seeking information from many sources on all aspects of the business and interprets, integrates, and evaluates it for use in decision making and subsequent communication with others.

Staffing. Takes action to identify, evaluate, develop, select, and remove employees as appropriate to build teams that get the job done and have people in place to run the business.

Short-term business execution. Responds to ongoing operational problems by balancing consequences and taking action to implement. Installs or changes systems to support operation.

Financial analysis. Uses financial tools to understand financial implications in business decision making and execution. Develops short- and long-range financial objectives and evaluates performance in relation to financial commitments.

Communication and climate setting. Establishes the environment (climate) for unfiltered information to be easily and informally received from and provided to all levels in his or her organization.

Strategic planning. Develops strategies and responses that have long-range consequences and takes the necessary action to implement them.

Customer and other external relations. Promotes company's interest by interacting with and influencing customers, vendors, and community leaders. Actively monitors legislative–governmental environment for changes affecting business.

Product planning and development. Seizes opportunities by anticipating new or expanded demands for products or services, selecting the right alternatives and stimulating others to develop market opportunities.

Organizational acumen. Understands and uses the corporate environment to achieve both individual and unit objectives.

^{A1} Definitions were originally reported by Russell (1990).

Appendix E

Moderators of Validity for Subjective Performance Ratings

Moderators of Validity for Subjective Performance Ratings

Moderator	N	K	Mean <i>r</i>					<i>I</i> ²	Q		T&F	
			N-weighted	Random effect (SE)	Corrected	<i>SD_r</i>	<i>SD_p</i>		Mod	W/in	Δ <i>K</i>	<i>r</i>
Battery included cognitive ability									4.3*			
Yes	3537	31	.35	.29 (.03)	.32	.15	.10	57		69.4**	13	.21
No	385	6	.16	.13 (.09)	.14	.23	.19	71		18.8**	—	—
Battery included personality									0.1			
Yes	2981	25	.23	.25 (.02)	.28	.12	.07	39		38.3*	10	.20
No	941	12	.29	.28 (.08)	.31	.26	.23	81		50.3**	0	—
Battery Included biodata									0.3			
Yes	1122	8	.19	.26 (.07)	.28	.19	.16	79		29.2**	—	—
No	2800	29	.26	.28 (.03)	.30	.16	.10	52		57.2**	7	.23
Assessment included interview									2.0			
Yes	3618	29	.23	.25 (.02)	.27	.12	.07	42		48.9**	9	.20
No	304	8	.37	.38 (.12)	.42	.34	.29	76		36.6**	—	—
Standardization of assessment battery									0.0			
Same procedure	3134	26	.25	.30 (.03)	.33	.17	.13	69		74.7	10	.21
Different procedure	495	6	.28	.28 (.04)	.31	.10	.00	0		2.3	—	—
Single vs. multiple assessors									0.9			
Single assessor	1570	15	.20	.24 (.04)	.27	.14	.09	46		26.1*	6	.18
Multiple assessors	1998	16	.26	.28 (.03)	.31	.11	.06	35		24.5	5	.23
Same vs. different assessors across candidates									4.4*			
Same assessor	421	9	.38	.40 (.07)	.44	.21	.14	47		14.4	—	—
Different assessors	2948	23	.24	.24 (.03)	.27	.15	.12	67		61.7**	0	—
Occupation									5.6*			
Managers	2346	22	.28	.32 (.03)	.35	.15	.11	58		48.1**	8	.24
Nonmanagers	1576	15	.18	.19 (.04)	.21	.15	.10	53		30.8**	1	.19
Source of recommendation									1.3			
Assessor	2910	23	.23	.25 (.03)	.28	.12	.08	47		43.6**	7	.20
Secondary source	750	8	.19	.18 (.06)	.20	.17	.13	59		15.7*	—	—
Purpose of performance rating									0.3			
Research	2317	18	.22	.27 (.04)	.29	.16	.12	68		50.3**	1	.26
Administrative	1436	14	.24	.23 (.04)	.26	.15	.11	56		28.7**	0	—
Publication type									1.1			
Journal articles	1383	20	.29	.30 (.05)	.33	.21	.17	68		55.7**	0	—
Other sources	2539	17	.21	.23 (.03)	.26	.11	.07	44		28.7*	6	.19

Note. All trim-and-fill estimates were imputed on the left side of the distribution; Trim-and-fill analyses were not conducted for subgroups with fewer than 10 studies. *N* = combined sample size; *K* = number of samples; *N*-weighted = average sample-size weighted validity; random effect = average validity from the random effects meta-analysis; corrected = average validity corrected for criterion unreliability; *SD_r* = standard deviation of the observed validities; *SD_p* = standard deviation of the validity corrected for sampling error; *I*² = percentage of variance beyond sampling error; Q mod = chi-square moderator test; Q w/in = chi-square test for homogeneity of observed validities; T&F Δ*K* = number of effect sizes imputed by trim-and-fill analysis; T&F *r* = trim and fill estimate of average correlation.

* *p* < .05. ** *p* < .01.

Appendix F

Developmental Challenge Profile: Scale Names, Descriptions, and Sample Items

Scale	No. of items	Description of scale	Sample item
Job transitions			
Unfamiliar Responsibilities	7	The manager must handle responsibilities that are new, very different, or much broader than previous ones	You have to manage something (e.g., a function, product technology, or market) with which you are unfamiliar
Proving Yourself	5	The manager has added pressure to show others that he or she can handle the job	Most of the people reporting to you are more experienced than you are
Task-related characteristics			
Creating change Developing New Directions	11	The manager is responsible for starting something new, making strategic changes, carrying out a reorganization, or responding to rapid changes in the business environment	You have to make major strategic changes in the business—its direction, structure, or operations
Inherited Problems	9	The manager has to fix problems created by the former incumbent or take over problem employees	You inherited at least one key direct report with serious performance problems
Reduction Decisions	4	Decisions about shutting down operations or staff reductions have to be made	You have to lay off a significant number of your people
Problems With Employees	7	Employees lack adequate experience, are incompetent, or are resistant	Your direct reports resist your initiatives
High level of responsibility High Stakes	9	Clear deadlines, pressure from senior management, high visibility, and responsibility for key decisions make success or failure in this job clearly evident	You are being tested by top management
Managing Business Diversity	3	The scope of the job is large, with responsibilities for multiple functions, groups, products, customers, or markets	You are responsible for numerous different products or technologies or services
Job Overload	6	The sheer size of the job requires a large investment of time and energy	This job requires you to put in long hours (60 or more hours a week)
Handling External Pressure	7	External factors that impact the business (e.g., negotiating with unions or government agencies, working in a foreign culture, or coping with serious community problems) must be dealt with	This job requires dealing with foreign governments that can have a substantial impact on the business
Nonauthority relationships Influencing Without Authority	7	Getting the job done requires influencing peers, higher management, external parties, or other key people over whom the manager has no direct authority	To achieve your most important goals, you must influence peers at similar levels in other units, functions, divisions, and so on
Obstacles			
Adverse Business Conditions	4	The business unit or product line faces financial problems or difficult economic conditions	The business or a major product line faces intensely competitive markets
Lack of Top Management Support	7	Senior management is reluctant to provide direction, support, or resources for current work or new projects	Resources are tight—you have to scrounge and “beg, borrow, or steal” to get the job done
Lack of Personal Support	4	The manager is excluded from key networks and gets little support and encouragement from others	It's difficult to find a supportive person to talk to in this job
Difficult Boss	6	The manager's opinions or management style differs from those of the boss, or the boss has major shortcomings	Your boss is opposed to something you think is important to do

Appendix G

Scale items used in the "Prospector" instrument

Scale Items

Scale	Eigen- value	% Variance explained	α	Sample item
End-state competency dimensions				
Sensitive to Cultural Differences	5.65	4.9	.82	When working with people from other cultures, works hard to understand their perspectives.
Business Knowledge	2.30	2.0	.79	Has a solid understanding of our products and services.
Courage To Take a Stand	2.20	1.9	.92	Is willing to take a stand on issues.
Brings Out the Best in People	1.99	1.7	.92	Has a special talent for dealing with people.
Acts With Integrity	1.38	1.2	.85	Can be depended on to tell the truth regardless of circumstances.
Is Insightful	1.32	1.1	.87	Is good at identifying the most important part of a complex problem or issue.
Is Committed to Success	1.25	1.1	.82	Clearly demonstrates commitment to seeing the organization succeed.
Takes Risks	1.01	.09	.72	Takes personal as well as business risks.
Learning-oriented dimensions				
Uses Feedback	48.60	41.9	.79	Has changed as a result of feedback.
Is Culturally Adventurous	3.30	2.8	.77	Enjoys the challenge of working in countries other than his/her own.
Seeks Opportunities To Learn	1.77	1.5	.85	Takes advantages of opportunities to do new things.
Is Open to Criticism	1.58	1.4	.76	Appears brittle—as if criticism might cause him/her to break. ^a
Seeks Feedback	1.15	1.0	.77	Pursues feedback even when others are reluctant to give it.
Is Flexible	1.07	0.9	.70	Doesn't get so invested in things that he/she cannot change when something doesn't work.

^a Reverse scored.

Appendix H

Analytics and global mobility, measuring effectiveness and ROI

		Global Mobility Analytics Framework			
		Measures	Hindsight	Insight	Foresight
		Examples			
Strategic alignment	Business	Measures the contribution made to the business, including growth and customer satisfaction	<ul style="list-style-type: none"> Proportion of assignments meeting specific business goals 	<ul style="list-style-type: none"> Increase or decrease by region, business, or sponsor 	<ul style="list-style-type: none"> Attributes of successful candidates
	Talent	Measures the impact of assignments on talent retention and performance management	<ul style="list-style-type: none"> Retention of assignees two years post assignment 	<ul style="list-style-type: none"> Availability of suitable roles and promotion opportunities post assignment 	<ul style="list-style-type: none"> Career planning Attributes of successful assignments
Effectiveness	Service	Measures the quality of mobility service delivery to company, business, and assignee	<ul style="list-style-type: none"> Customer satisfaction Mobility responsiveness 	<ul style="list-style-type: none"> Areas requiring attention to enhance satisfaction Impact of service on productivity 	<ul style="list-style-type: none"> Interventions in individual assignments
	Operational	Measures the efficiency of global mobility program administration, including the cost of internal and external administration resources	<ul style="list-style-type: none"> Global mobility staff turnover rates Vendor performance against KPIs 	<ul style="list-style-type: none"> How to improve retention KPIs impact overall program 	<ul style="list-style-type: none"> Re-alignment or training of mobility personnel
	Financial	Measures the cost of providing mobility related compensation and benefits to mobile employees under the global mobility program	<ul style="list-style-type: none"> Total cost per assignment Relocation cost as part of total assignment cost 	<ul style="list-style-type: none"> Accrued cost vs. actual Large number of vendors servicing program 	<ul style="list-style-type: none"> Vendor service review Policy utilization
	Process	Measures the extent to which mobility processes result in accuracy, timeliness, and efficiencies	<ul style="list-style-type: none"> Number of inaccurate payments Number of days to complete cost projection 	<ul style="list-style-type: none"> Where delays are occurring in the process Accuracy of assignment information provided 	<ul style="list-style-type: none"> Implement regular status updates from vendors

Data and analysis capabilities

Appendix I

(Adapted from: Shen, K. 2011. The Analytics of Critical Talent Management. *People and Strategy*, 34: 50-56)

Collecting and analyzing employee data: Establishing a platform for forecasting

Below is a real life case study of the steps that an aerospace supplier used to diagnose problems within their internal labor market and recruit the necessary number of design engineers to ramp up business for a new airplane order.

Step 1 - Framing the business issue

- HR and company line leaders worked together to define the issue at hand: “How can the business ramp up staffing for a new product line that would need to be designed, tested, and manufactured to strict tolerances and with customer and agency oversight?”
- Burning platform: Successful product development depends on the company’s ability to attract, retain, and develop top industry performance.
- Challenges: A recovering market, shortage of skilled workers, an aging workforce, and employee turnover.

Step 2: Conducting research and data analysis

- Team researched internal labor market and external employment information.
 - An effective method for this purpose is Mercer Consulting’s Internal Labor Mapping (ILM). ILM looks at the entire set of employee transactions over time, including attraction and hiring, development, promotion, lateral movement, geographic or functional assignments, and retention. With this information it creates a compelling visual of employee movement that serves as a platform for workforce forecasting.
- Analyzed quantitative and qualitative data through focus groups and interviews.
- The team conducted further analysis to stratify employee separations by key functions, age group, years of service, and levels within the organization, and noticed several patterns such as that “high potentials and key business leaders constituted 19% of turnover rate.”

Step 3: Conducting external benchmarking of turnover, retirement risks, and costs

- Team compared company’s internal data with industry-specific separation rates published by Department of Labor and Bureau of National Affairs.
- Found that company’s turnover rates were double the national averages.
- Team looked at industry studies and forecasts put out by consulting agencies and determined that “the two most pressing issues for aerospace in the future are the ageing workforce and an increasing lack of technical talent.”

Step 4: Assessing external supply

- Team gathered information on the supply of future aerospace workers from sources such as the Bureau of Labor Statistics, predicting that the aerospace industry would suffer a 17% decrease in employees from 2002 to 2012.

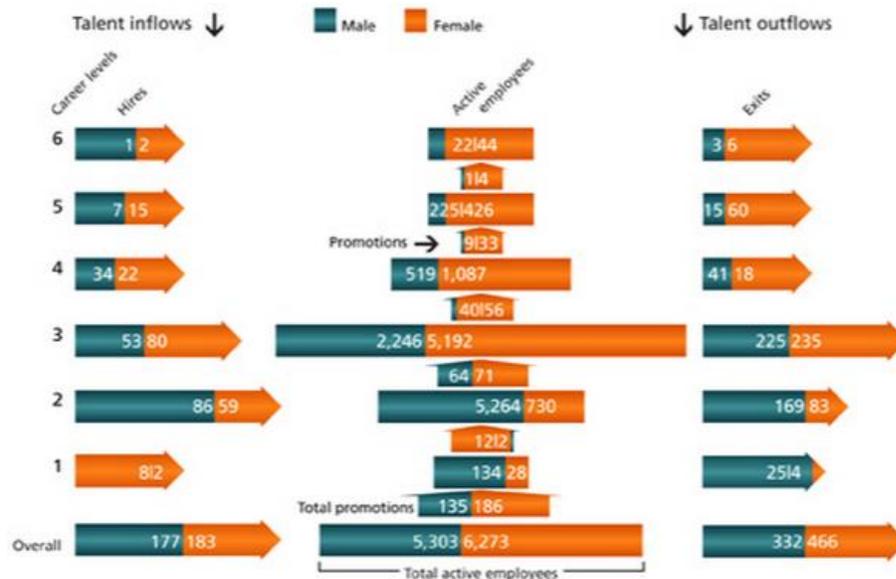
Step 5: Calculating the costs of turnover

- HR presented the high costs of the voluntary separation and replacement of aerospace engineers in relation to operating income, which strengthened their business case.
- Calculated cost of turnover as 150% of employee’s salary and up to 34% of operating income.

Appendix I, Continued.

Step 6: Assessing internal movement

- Team gathered voluntary and involuntary information from past 3 years and workforce demographics for the firm's location in the U.S. and overseas in order to identify who was leaving, for what reasons, and for what locations. The chart below from Mercer's Internal Labor Market mapping highlights employee promotions and turnover:



- Team identified areas with bottlenecks and highest turnover rates.

Step 7: Developing qualitative data about “why stay and why leave?”

- In-depth exit interviews were conducted of employees who left voluntarily and were considered “regrettable exits.”
- HR also conducted focus groups and interviews among incumbents in mission critical job categories.
- This process revealed that internal communication, availability of career advice and career paths, and appropriate roles and responsibilities are the most significant drivers of retention.

Step 8: Developing an action plan

- From all information gathered HR recommended a comprehensive retention action plan.

Workforce forecasting

In 2007, healthcare provider Kaiser Permanente Northern California (KP) developed a comprehensive supply and demand forecasting model in efforts to close forecasted diversity gaps between the homogeneous makeup of organizational leaders versus the diverse makeup of their patient and staff populations.

The HR, Diversity, and Market Research department partnered on a forecast, drawing upon information from census and university and private research, about the growth and changes in the [demographic] mix of California's population. The

forecast recognized that in 2010 the Spanish-speaking Latino population equaled the non-Spanish speaking White population in California, at 39% of total population each.

Having this kind of insight into their present and future demand, the expected demographic breakdown of their customer population, as well as their future labor market supply allowed HR to implement an accelerated development program for the next generation of diverse leaders.

Furthermore, KP also developed a comprehensive supply and demand model (below) with collaboration with UC San Francisco’s Center for Health Professions. The model is designed to be very flexible and use critical business drivers to identify a variety of scenarios.

The model can be used to track internal and external forces such as process improvements, market growth or contraction, new technologies, and changes in healthcare delivery.

For example, in a forecast of required pharmacists KP conducted analytics using pharmacy operations data of the number of prescriptions filled. The firm made assumptions based on demographics of patient age and acuity, and patient population growth. The pharmacy forecast then factored in trend data about how prescriptions for medications are filled and delivered (in person vs. mailed, big-box store vs. hospital or local pharmacy). The model also factors in improvements in business systems, team staffing, and the new mail-order process.

Prior to using analytics at KP the metric driving hiring decisions was a recruiting metric called the vacancy rate, which was a function budgeted slots available, not a reflection of true need and not tied to any operations data.

EXHIBIT 3: KAISER PERMANENTE'S SUPPLY AND DEMAND FORECAST MODEL

Current Staffing		Internal Staff Changes		Service Growth		Lean & Elim Waste		Tech Changes		NET REQUIREMENTS		New Grad Recruitment		Experienced Recruitment		New Supply Summary					
FTEs	FTE	FTE	Q,06	Impact	FTE	Impact	FTE	Impact	FTE	NET REQUIREMENTS	FTE	FTE	Part Time	FTE	FTE	WKF Gap					
1000			10 stores									Grads in catchment area	125	External Hires	25	32	60				
Retirement Rate	0,12	Retirees	120	Pharm	60	Inpatient Pharm	0,05	50	Electronic Rx System	0,1	100	BASE	1000	Historical market share	0,2	Realized Hires	18	Transfer to Full Time	22	New Grad	25
Voluntary Loss Rate	0,01	Voluntary Loss	10	Tech	40	Team Staffing	0,01	10	Mail Order System	0,05	50	LOSS	170	Net new Grad Hires	25	Net New	11	External		18	
Involuntary Loss Rate	0,04	Invol Loss	40									CURRENT	830	New Hire Cost Analysis		Hire Cost Analysis		Internal Hire Cost		Internal	11
		Loss	170	Growth	100	Loss	60	Loss	150			CHANGE	-110	Recruiting Budget	\$100,000	Recruiting Budget	\$300,000	Training Budget		Supply	54
												Total Staff Demand	890	Yield New Hires	25	Realized Hires	18	Realized Hires		Gap	6
												Workforce Gap	60	Cost per Hire	\$4,000	Cost per Hire	\$16,667	Cost per Hire			

* For this model, internal hires could include those retained for this position. The costs of the retaining should be captured here. The retaining may be short- or long-term, depending on the position and qualifications of applicants.

Predictive Analytics

Business Issue: A global metals manufacturing company implemented a new lean production system, need to add lean production leader roles in its workforce, and wanted to know “what makes a person a successful leader under such specific circumstances?”

Steps Taken by Analytics Project Team:

1. HR partnered with operations to conduct in-depth analysis of manufacturing results under every supervisor. They measured quality, safety, delivery performance, and innovative process improvements.
2. The data yielded a matrix of each shop supervisor and their team's results.
3. High performing supervisors whose results were 150% better on all measures were then invited to incident interviews with their leadership. These interviews focused on pivotal stages in their manufacturing process where events could hamper quality and productivity goals.
4. From this they developed a preliminary model that described differentiating factors of their success, including specific behaviors that were found to be common to all of the successful supervisors. A competency model was also born from this and feedback from line management, HR, and leadership team.
5. Three critical behaviors that could predict success in leading a team of lean manufacturing associates were identified:
 - 1- Getting started on the job with orientation.
 - 2- Setting expectations of team norms and behaviors.
 - 3- Coaching team-members in problem-solving and use of lean tools.
6. These critical behaviors depended on the supervisor understanding and using lean tools and knowing how to act as a coach rather than in a directive manner.