

Human Resources Analytics

Prepared by Dr. Samah Abdelfatah

HRM 623

Lecture 8



Turning Data into Business Intelligence

Chapter
06

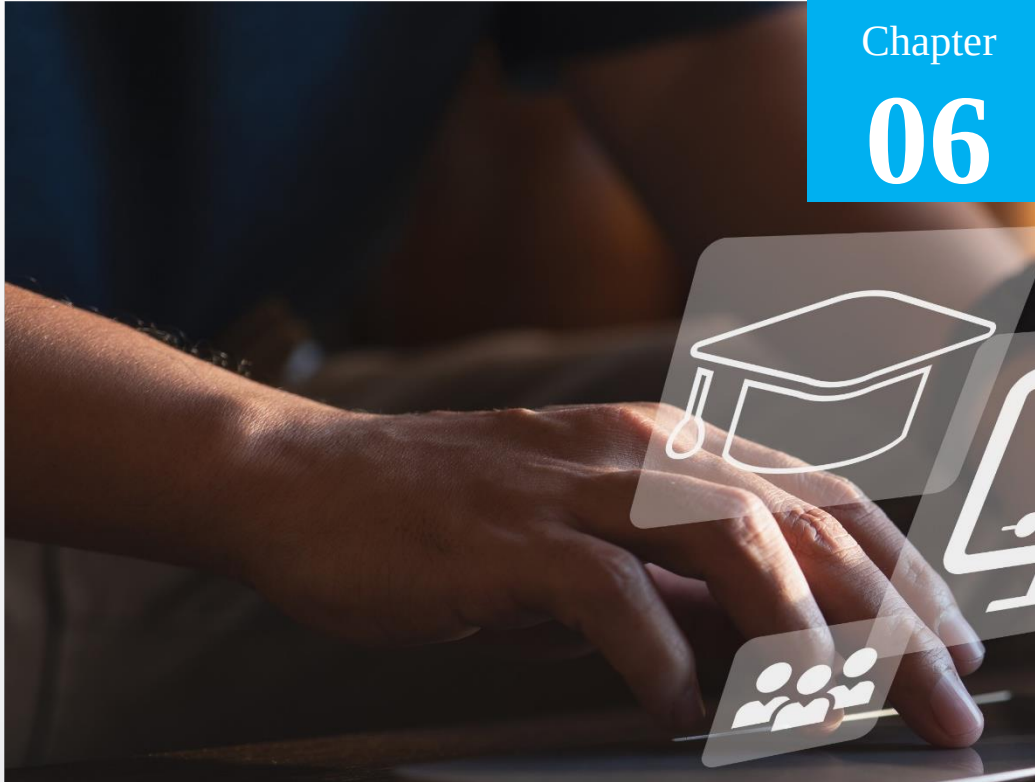
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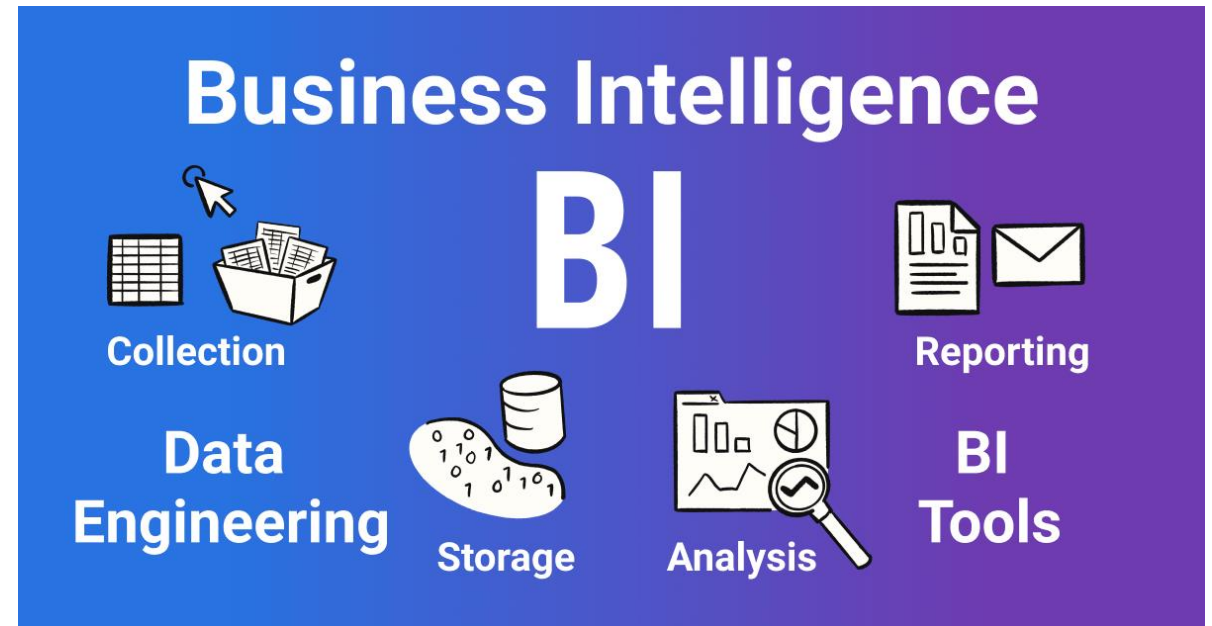
MAIN TOPICS



What Is Business Intelligence? —Development Of Metrics —The Need For Integrative Measurement— How To Interpret The Data? — Identifying Human Capital Processes—Choosing the Most Appropriate Metric— Plan for How the Data Will Be Used

WHAT IS BUSINESS INTELLIGENCE?

- Business intelligence combines business analytics, data mining, data visualization, data tools and infrastructure, and best practices to help organizations make more data-driven decisions.



WHAT IS BUSINESS INTELLIGENCE?

- **There are many reasons for human capital analysis and measurement to be so important today:**
 1. If you don't measure it, you don't know what is actually happening.
 2. If you don't understand it, you can't control it.
 3. If you can't control it, you can't improve it.

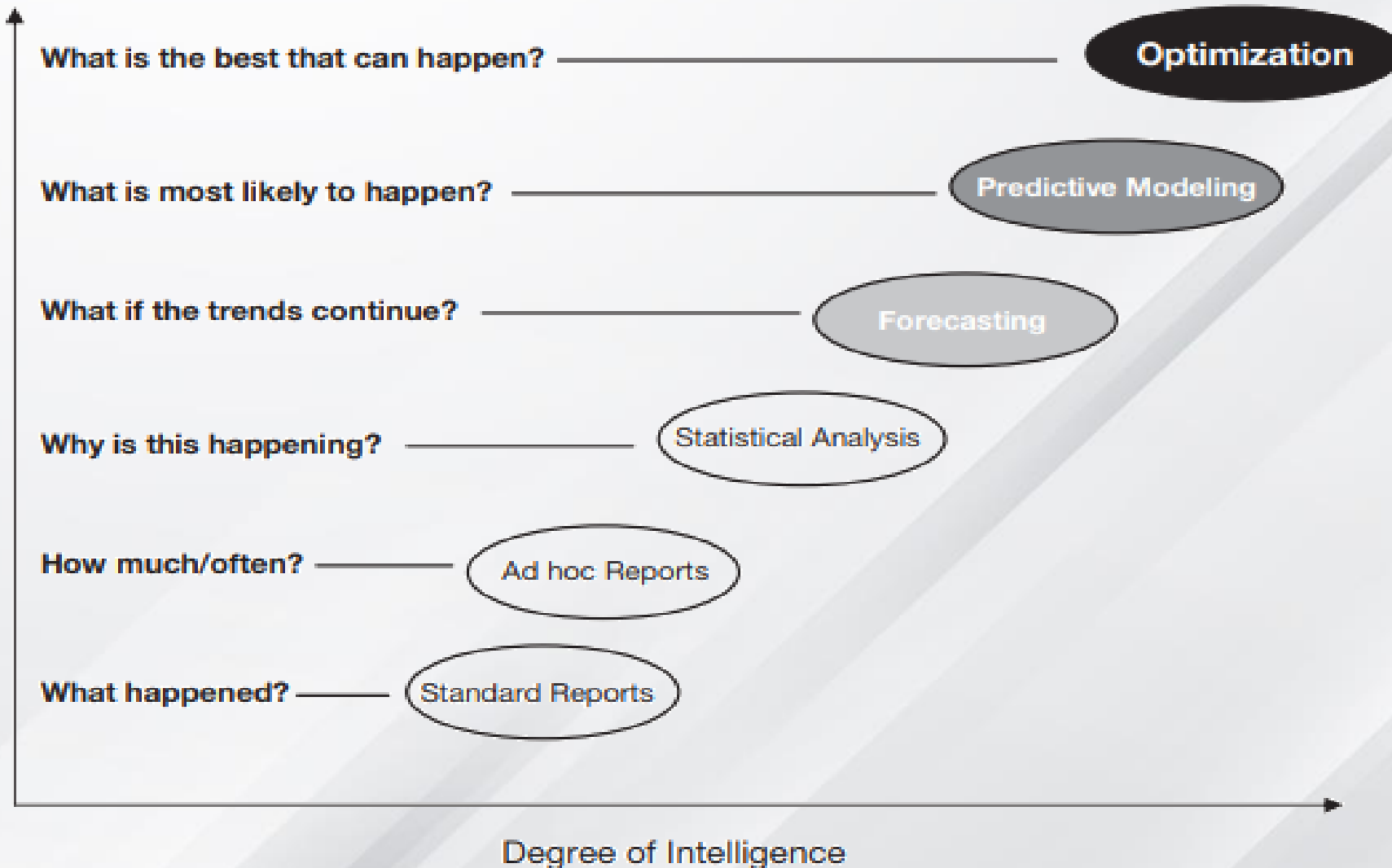
Your business decisions should be based on empirical data. Analytics promotes accuracy, consistency, and a broader view of the effects of HR services.

DEVELOPMENT OF METRICS

- The term metrics evolved from the work we started in the 1970s. It wasn't called metrics then—just “measurement.” Over time, the term metrics started to be used, and by the late 1980s,
- **Second-Generation Metrics:** Benchmarking: Benchmarks are comparisons between companies on various dimensions: industry, location, size, or growth rate. They help managers evaluate their work to some degree.
- **Third-Generation Metrics: Predictive Analytics That Yield Business Intelligence :** To learn why some situation is changing, you need to move up from metrics and benchmarking to statistical analysis, which then ultimately leads to prediction and optimization.

Figure 6.1. Degrees of analysis and business intelligence.

Degree of Analysis



UNDERSTANDING PREDICTIVE ANALYTICS

- **Correlation.** When two events move in the same direction concurrently, they are viewed as correlated. This does not mean that they are necessarily related.
- **Causation.** In a more complex example, in the case of staffing. There are multiple inputs to that process, including many applicant sources, various selection methods, etc. How do you know which variables have an effect on the outcomes?

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THE NEED FOR INTEGRATIVE MEASUREMENT

Why the companies did not build an integrated measurement system with a future focus ?
The reason is twofold:

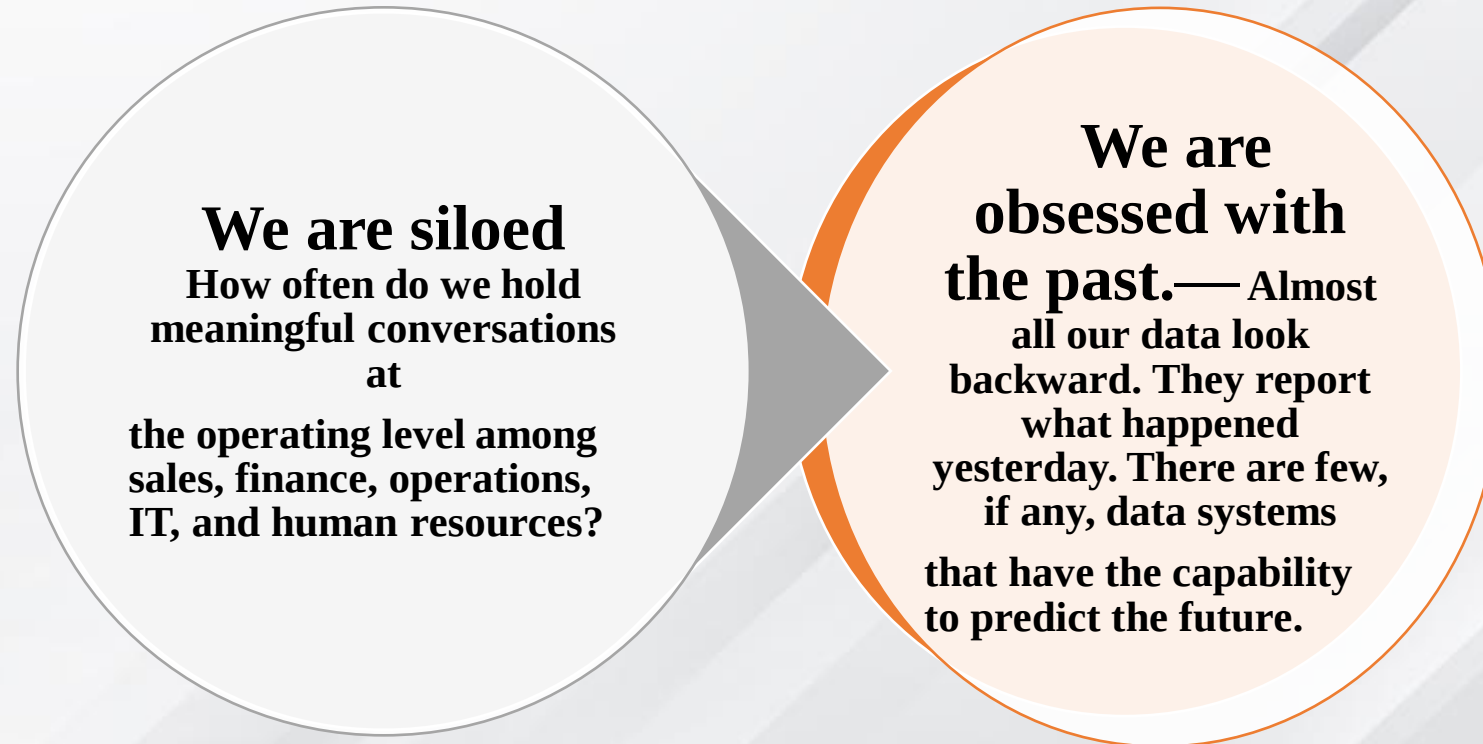


Figure 6.2. Three-point integrated measurement system.



CONNECTING THE THREE LEVELS OF METRICS

Figure 6.3. Connections between variables.



Chapter

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BUSINESS INTELLIGENCE: THE ULTIMATE GOAL

- When data are aggregated from various sources, they begin to take on meaning beyond just the raw numbers. And this is where business intelligence (BI) begins.
- BI allows organizations to collect, organize, integrate, and deliver reports that uncover hidden connections in the data.



HOW TO INTERPRET THE DATA?

Predictive Analytics For Human Capital Management

- **Understanding the Variables of Predictive Analytics**
- Variables can be thought of as “fields” of data, or individual pieces of data; typically, they are the columns on a spreadsheet. All of those columns—age; gender; years of service; education; performance score A, B, or C; and so on—are the variables.

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- **Why call them variables?** Because they are not constants—the data for each of these variables vary for each case (think of a case as a person).

Categorical Versus Continuous Variables and Levels of Variables

- **Categorical variables** are made up of types, classes, or categories. E.g. the variable “gender.” It has two categories—male and female.
- **Continuous variables**, on the other hand, are numbers or numerical. Anything you would report as a number is a continuous variable. E.g. Years of service could be one continuous variable; numeric age would be another

How Variables Relate to Each Other?

- There are **two** major ways to think about how variables relate to each other: ***interdependently and dependently***:

1. Interdependence Techniques: These techniques are used to see how things relate to each other (or group together)

Factor analysis

- Deals with variables and tries to answer this question: Are there groups of variables that hold together (i.e., are highly correlated with each other), such that they reveal an underlying theme? For example, say that there is a scale measuring the culture of a workplace.

Cluster analysis

- Works with cases instead of variables. Recall that cases are people—the rows in your database. Cluster analysis looks for groups of people that have similar data across a range of variables. The people in a group (called a cluster) have characteristics similar to each other, and they are different from the people in other clusters.

Figure 6.4. How questions come together to make a factor.



Figure 6.5. Example clusters.



How Variables Relate to Each Other?

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2. Dependence Techniques

Dependence techniques are used when you try to predict some outcome based on some number of predictors.

Multiple Regression

- Is that your outcome is a continuous variable (numeric). If, in the example, productivity was rated on a numeric scale from 1 to 10, you could use multiple regression to determine which predictors were most influential in increased productivity, as shown in Figure 6.7.

Discriminant Function Analysis

- Is used when the outcome variable is categorical. Imagine that productivity is simply rated high, medium, or low. You can still determine which predictors are most influential; however, your outcome scale is simply more crude than a numeric scale. See Figure 6.8.

Figure 6.6. How predictors conceptually lead to outcomes.



Figure 6.7. The concept of multiple regression.

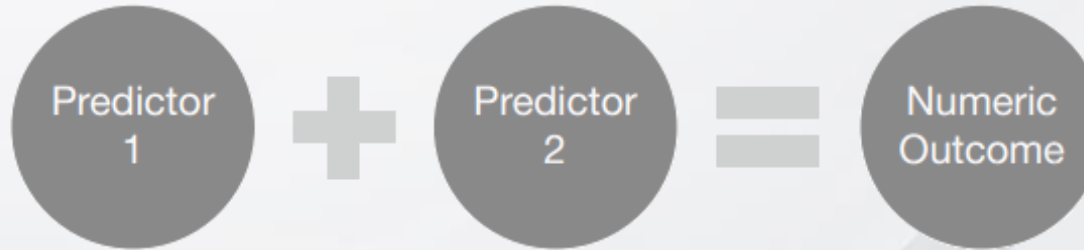
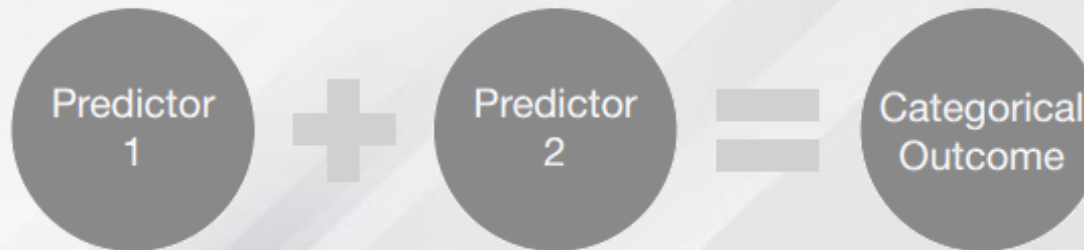


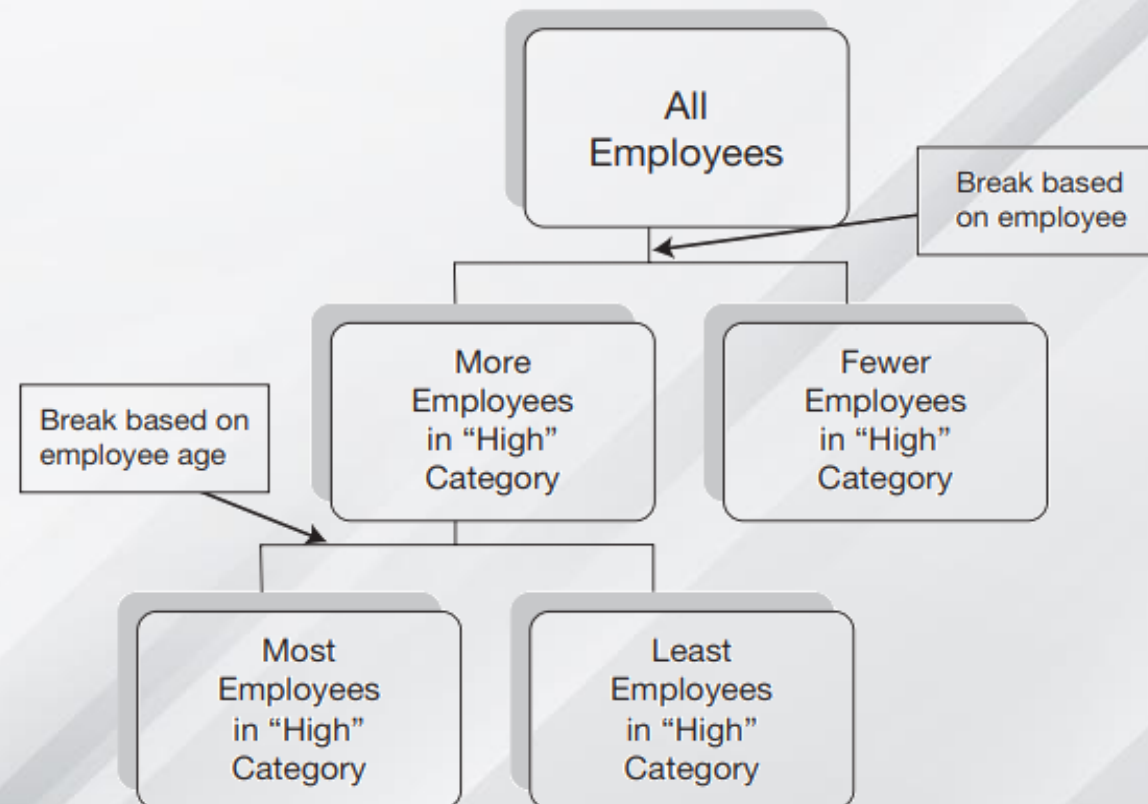
Figure 6.8. The concept of discriminant function analysis.



DECISION TREES

A family of techniques that use visual branching diagrams, decision trees, show how certain predictor variables lead to a specified outcome variable (often called a target variable). Both categorical and continuous variables can be used as both predictors and outcome.

Figure 6.9. An example of a decision tree analysis.



Checklist for Using Predictive Analytics

1. **Start with your objective(s):** What do you want to find out in a strategic sense? What is your hypothesis? Keep it as simple, specific, and actionable as possible. Many studies have been ruined by lack of specificity and practicality.
2. **Operationalize your hypothesis:** How will you act on the information that you pull in? Translate the theoretical/strategic words into variables. Determine whether you have the data or need to get them. Are those variables you just operationalized available?

Checklist for Using Predictive Analytics

3. Understand your variables: Which are continuous and which are categorical? What are the levels of the categorical (classes) variables and the scales of the continuous variables?

4. Determine the technique that fits your hypothesis: Call in your local statistician for help. Explain your goal and let the statistician find the best way to obtain a valid and actionable result.

5. Collect your data and run your stats: A discussion of data collection methods and details of analyses are beyond the scope of this essay.

Checklist for Using Predictive Analytics

6. Balance statistical with practical significance: Especially with large sample sizes, statistical significance may appear. Always ask yourself if the difference is large enough to matter.

7. Tie the findings back to your original questions: Okay—what now? Given that each question was a practical one in the first place, now is the time to take some action based on the findings.

IDENTIFYING HUMAN CAPITAL PROCESSES

- So, what are the human capital processes that should be measured in today's grim economy, and, going forward for that matter, as a routine process?
- There are six core processes that need to be measured and they are recruiting, learning and development, performance, talent, leadership, and engagement.

HUMAN CAPITAL PROCESSES

- Each has subprocesses that allow for more micro measurement. They are as follows:

Recruiting

- Forecasting workforce requirements
- Recruitment, selection, and hiring
- International assignment
- Mobile workforce
- Employee turnover

Learning and Development

- Onboarding
- L&D
- Coaching
- Knowledge management

Performance Management

- Performance appraisal

Talent

- Competencies assessment

Leadership

- Succession planning
- Leadership development

Engagement

- Compensation and benefits
- Employee satisfaction
- Employee engagement
- Work-life balance
- Workforce diversity

Measuring Human Capital Makes a Difference

- ***How can measurement make a difference? Here are some brief examples:***
 - ✓ On average, learning and development programs improve workforce performance by 4.8 percent, which translates to \$2,820 per employee in improved workforce outcomes (based on 600,000 evaluations taken two months after training over a three-year period).
 - ✓ A leading ERP company returned 18.2 percent in productivity gains by training end-users in its software and how to better use it
 - ✓ A consumer packaged-goods company attributed \$74,000 in increased sales per person directly to a sales force effectiveness investment of \$5,000 per person.

Performance Management Is the Outcome of Measurement

- Measurement of human capital doesn't matter if it is not part of a process. Like any metric, it must be used to stimulate change and drive people to take action.
- Technology can gather evaluation data easily. Tools exist specifically for human capital professionals to allow them to author, administrate, and report.

Performance Management Is the Outcome of Measurement

- The *human capital analyst* needs to do the following with data to make them a performance management process that informs decision making:

Trend it.

- Gather data consistently and comparably.
Do trend line analysis on key performance indicators.

Benchmark it.

- Internal and external benchmarks of both actual results and evaluation data allow an analyst, and others who use the data, to have a point of reference to better interpret the information being analyzed

Set goals against it

- Any measure worth managing needs to have goals set against it.
The key is to have challenging yet attainable goals

Dashboard it

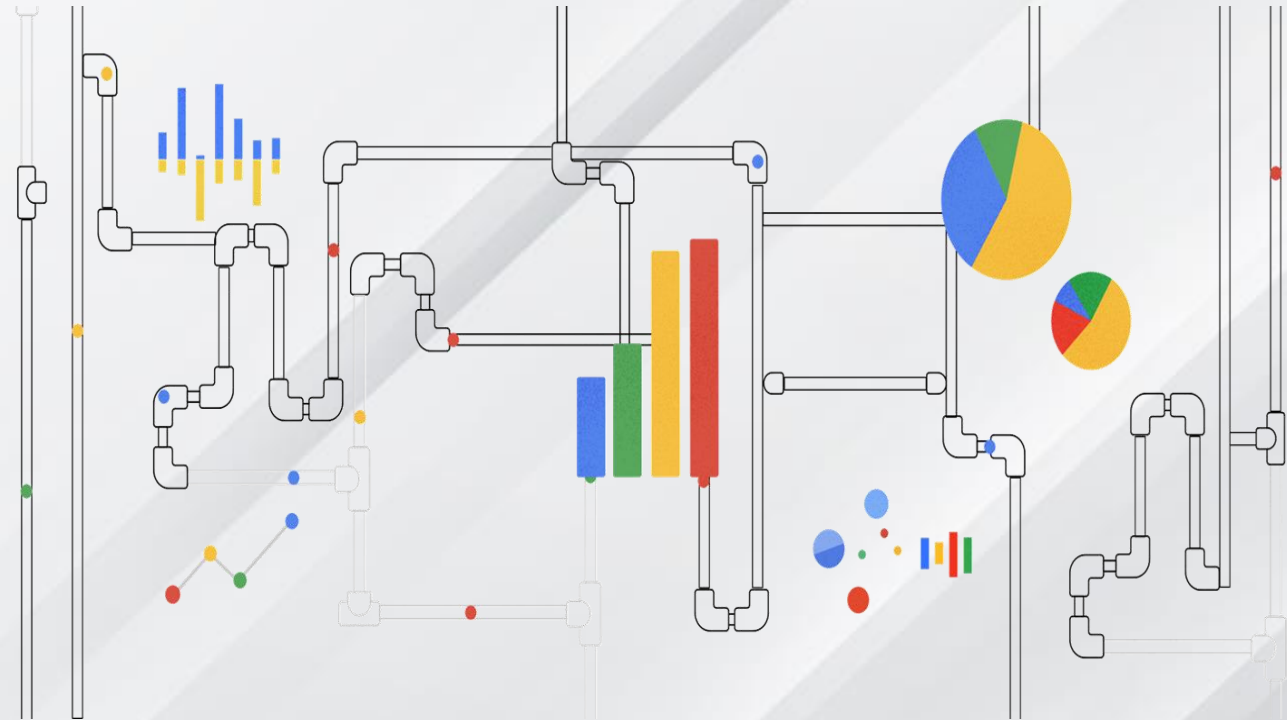
- A dashboard is a convenient place to store summary data that are visual and concise.

Compare it to actual results.

- Evaluation data are great and can be tapped to review the past and forecast the future. Then, correlate the data with actual results.

USING HR METRICS TO MAKE A DIFFERENCE

- A key way to maintain high levels of performance in the organization is to monitor the subsystems, or processes, that drive the system.



Choosing the Most Appropriate Metric

- Two metrics that certainly would be useful are **job vacancy** and **turnover**.
- Next, ensure that the metric used is constructed in a manner so that it provides clear information.
- A common approach to calculating **job vacancy** is as follows:

$$\frac{\text{Total number of positions open as of today}}{\text{Total number of positions filled as of today}} \times 100$$

Choosing the Most Appropriate Metric

- **Unfortunately, this calculation is not at all clear.**
- Consider a company that has 1,000 positions when all positions that are budgeted are filled. Now, look at how job vacancy, as calculated with this equation, can become very confusing:
 - **Scenario 1: 100 positions open today, job vacancy is 11 percent**
 - **Scenario 2: 500 open positions today, job vacancy is 100 percent**
 - **Scenario 3: 750 open positions, job vacancy is ?**

The problem is that with this calculation, turnover results in both the numerator and the denominator changing—the numerator increases and the denominator decreases; that is, nothing in the equation remains constant.

Choosing the Most Appropriate Metric

- **An alternative calculation that would remove the confusion is:**

$$\frac{\text{Total number of positions open as of today}}{\text{Total number of positions budgeted (for some period of time)}} \times 100$$

Using this equation, the scenarios noted above would change to:

Scenario 1: job vacancy is 10 percent

Scenario 2: job vacancy is 50 percent

Scenario 3: job vacancy is 75 percent

GROUNDNED THEORY PROCESS

- This approach can be used to develop a substantial understanding about turnover in an area of the organization.
- **The steps to take are as follows**



1. Preparation

- Describe the process to the managers that will be impacted.
- Respond fully to any questions they have.
- Assure them that there will be no secrets—and keep the promise.
- Provide a list of others who have gone through the process.
- Show the managers the list of questions that will be used to start the study and ask for their input.
- Modify the questions appropriately.

2. Initiate the study

- Select those who will be interviewed in the first group.
- Meet individually with each person selected; ask the planned questions and any additional questions needed for clarification.
- Carefully document the answers.
- Review the answers and look for patterns.
- Create a second set of questions based on the information that was derived from the first round of interviews

3. Continue the study

- Select a second group—choose those most likely to provide the needed information.
- Use the second set of questions and any additional questions needed for clarification.
- Carefully document the answers.
- Review the answers and look for patterns.
- Continue this process until all concepts are “saturated” (i.e., there does not appear to be any additional useful information to be obtained).

Plan for How the Data Will Be Used

- Throughout the process, there are some analytic tools that are helpful to get to the underlying causes of past and future turnover as quickly as possible.
- **Here are some suggested tools:**
 - **Use conceptual ordering.** Organize the information into discrete categories or concepts (e.g., turnover is occurring due to ineffective conflict)
 - **Dig deeper.** Watch for words or phrases that strike you as significant. Use “flip-flop” technique (i.e., look for opposites or extremes to make the information more meaningful).
 - **Check the concepts.** Ask the participants about what appear to be the causes of turnover; this is done in an effort to check the validity of the concepts with those involved in the study.

Plan for How the Data Will Be Used

- **Break the concepts into sub concepts.** When it makes sense, pull apart a potential cause of turnover. Consider “change strain” as a cause of turnover. Make special note of comments such as:

“We don’t get a chance to learn new things before something else starts. We never get a sense of mastery.”

“We are changing so much. I don’t know where we’re going. I’m beginning to worry about my future here.”

“Stress here is just too much.”

Plan for How the Data Will Be Used

- **Insert memos.** As analysis of the documentation progresses, insert memos that include a list of the concepts and definitions. Be sure the memos fit together logically.
- **Provide ideas for how turnover might be reduced.** Once the information gathering and analysis is complete, spend considerable time developing ideas that the managers might use to reduce turnover.
- **Now the information is gathered, the causes of turnover are understood, and ideas have been generated for reducing turnover.**

Bring It All Together—What Does It All Mean?

Chapter

Table 6.1. HR scorecard.

Category	Metric	Frequency
Attracting Talent	Job vacancy rate	Monthly
Attracting Talent	Number of hires	Monthly
Attracting Talent	Time-to-hire	Monthly
Attracting Talent	Type of hire—add vs. replace	Monthly
Attracting Talent	Source of hire	Biannually
Engage	Number of grievances	Annually
Engage	Employee referral	Biannually
Engage	Employee satisfaction scores on surveys	Biannually
Operations	RN FTE per patient	Annually
Operations	Salaries, wages, and benefits as a percentage of budget	Annually
Operations	Salaries, wages, and benefits per case-mix adjusted admission	Annually
Operations	Defects—issues, malpractice suits, etc.	Monthly
Operations	Cycle time—actual patient stay vs. planned stay	Monthly
Operations	Revenue per employee	Biannually
Retention	Total and voluntary turnover	Monthly
Retention	180-day turnover rate	Annually
Retention	RN ages—% eligible for retirement in 5 or fewer years	Annually
Retention	Top voluntary turnover reasons	Biannually
Retention	Retention rate for top performers by dept. or job code	Biannually
Workforce Demographics	Headcount vs. budget	Monthly
Workforce Demographics	Active FTEs	Monthly
Workforce Demographics	Contract employee use by job code	Monthly
Workforce Demographics	Count of staff by diversity category	Biannually
Workforce Demographics	Count of staff by gender	Biannually
Develop	Training type	Biannually
Develop	Training spend	Annually
Develop	Promotions	Biannually



Thank You