

CHAPTER 1

Human Capital Analytics

“Information is the oil of the 21st century, and analytics is the combustion engine . . . pursuing this strategically will create an unprecedented amount of information of enormous variety and complexity.”

—Peter Sondergaard, senior vice president,
Gartner; quoted in the *Register*¹

Human capital analytics can be approached in many different ways. Some organizations are very sophisticated at people measurements, while others are just beginning to think about starting the measurement journey. Investments in your people, your most important asset, can show financial returns to the organization, while also showing benefit to the employee through improved engagement and retention. Analytics on human capital investments is a very powerful way to improve those returns, on both the individual and the organizational level. This book focuses on *predictive analytics*, analytics that not only measures impact but also helps optimize and prescribe future investments. We hope that this book will improve your understanding of the power of optimizing your people investments. In the end, you will know not only how your HR investments are performing but how to improve them as they are deployed.

Predictive analytics is being successfully applied in the private, public, nonprofit, educational, and government arenas. Organizations that apply analytics to their human capital generally outperform their competitors. In a 2010 study of 179 large companies, those organizations adopting “data-driven decision making” achieved productivity gains that were 5 to 6 percent higher than those that did not.²

This work has been perfected in many industries and organizational areas during the last 30 years. Davenport shows many areas where advanced analytics are being applied. The financial services industry uses advanced analytics for credit scoring, fraud detection, and underwriting. The retail industry uses analytics for marketing promotions, inventory replenishment, and demand forecasting. Manufacturing organizations use analytics for supply chain optimization and warranty analysis. The hospitality industry uses analytics for pricing, customer loyalty, and yield management. The transportation industry uses analytics for scheduling, routing, and yield optimization. Drugs are tested and taken to market using advanced analytics. Recently, this tool is being applied to the world of HR investments.³

It is one thing to be able to show the benefit of a human capital investment by calculating the business impact and its return on investment (ROI). But to gain insight into where the investment is working and where it is not allows you to identify opportunities for improvement. Building on the work from those thought leaders discussed in the introduction, we will show you the methodology behind getting to an *isolated* business impact using your company’s data, rather than relying on subjective opinions gathered through surveys.

Understanding how the investment is working, while isolating the impact from all of the other variables internal and external to the organization, is not the end in itself. There are many methodologies to estimate the business impact and ROI of an investment. We will show you the value of isolating the impact that allows you to evolve to optimization by segmentation (job title, tenure, department, location, business unit, region, and so on)—understanding where the investment is working and where it is not. Understanding where your HR investments are having an impact and where they are not allows you to predictively increase or decrease your investment in each area. Isolating investments from all of the other variables is not simple, but

we know it is the best way to achieve optimization. Accurate, isolated, and precise impact provides optimization almost as a free benefit.

Generally, there are two types of HR investments: direct and indirect. A direct investment has a clear, or direct, line of sight to the business outcome you are trying to achieve. Sales readiness initiatives most often are trying to increase revenue, gross margin, or new accounts. Customer call center training strives to decrease average handling time, or the number of calls escalated to the supervisor. An indirect investment does not have a direct line of sight to the business outcome. What are the business outcomes for a leadership development program, a mentoring program, or a performance management system? The outcomes are not so obvious, thus indirect. Our methodology applies to both.

This book is not for those who want to merely justify your HR investments, but for those who want to improve them. Relying on average business impact is limiting and sometimes even misleading. Consider these scenarios:

- Suppose in a retail organization your “customer first” program was increasing overall same-store revenue, but it was not working in the Northeast. Would you adjust anything?
- If your leadership development initiative was successfully building the management pipeline, but you discovered it was working only for men, what would you do?
- What if your new on-boarding program showed an increase in initial performance, but the benefit disappeared after the first six months. Would it still be worthwhile?
- Suppose your new call center training program successfully increased sales, but also increased call handling time. What would you need to know in order to see if the training was responsible and whether the overall return was worthwhile?

If you could answer these questions, of course you would make changes to your program. This is the power of optimization. You no longer need to deploy programs using anecdotes and myths, but rather evidence.

This book has seven case studies that will show you how leading organizations are using the power of analytics to improve their HR investments. In this chapter's case study, Lowe's home improvement stores will illustrate how advanced analytics is used to link employee engagement with store performance. In Chapter 2, Rio Tinto, a leading international mining company, shows how it aligned a safety program to not only its employees but to more than 50,000 contractors as well. In Chapter 3, we will show you how Sun Microsystems (since acquired by Oracle) developed measurement plans for the introduction of a social learning platform. In Chapter 4, U.S. Bank comes to terms with locating and using complex data. In Chapter 5, both Chrysler and VF Corporation (the world's largest apparel company) show you how they organized their existing data to provide insights into their workforce. In Chapter 6, Chrysler isolates how much of the superior performance, shown by trainees, was due to the training itself. And in Chapter 7, ConAgra Foods and Chrysler use predicative analytics to optimize their human capital investments.

Although the case studies we highlight are from large public companies, the work we will show you in the book can be simplified for smaller organizations.

HUMAN CAPITAL ANALYTICS CONTINUUM

Let's begin with the human capital analytics continuum—a look at how organizations collect and report data. Exhibit 1.1 shows our view of human capital analytics. The continuum is based on what we have seen in our work, starting with simple, commonly used techniques. Viewing the continuum as a mountain, we suggest that similar to mountain climbing, things become more difficult but the view improves as you reach higher ground.

The ascent begins with anecdotes or storytelling. Brinkerhoff has done some of the best work in this area, describing a mixture of ethnography and positive psychology in "Success Case Methodology."⁴ This well-thought-out interview has important applications in clinical psychology, anthropology, expert systems, and many other areas.

Scorecards and dashboards are other important areas. Scorecards, most notably "Balanced Scorecards," are a strategic performance



Exhibit 1.1 Continuum of Human Capital Analytics

management tool that can leverage automated surveys to track how an organization executes strategy and the consequences arising from business processes, most commonly referred to as activity metrics.⁵ Scorecards characteristically have a mixture of financial and nonfinancial measures, each compared to its targets, all within a single concise report. They are an important step on the continuum, because this is where you must lay out the basic assumptions: what are your strategies, and what are the various ways in which you will measure them?

Dashboards share those characteristics. A dashboard is a distillation of the most important key performance indicators of a company that an executive can view at a glance. Dashboards might be an ad hoc effort put together on spreadsheets or even lower-tech tools, or they may involve special-purpose programming. Chapter 5, “What Dashboards Are Telling You: Descriptive Statistics and Correlations,” details how basic descriptive statistics, such as those in dashboards, can be rich sources of data.

Benchmarks are another step on the continuum. Benchmarking has long been used as a standard tool; the idea is that studying the best-run companies in a specific area can be very beneficial in terms of

setting things such as salary, training levels, desired turnover rates, and so forth. In our opinion, benchmarking needs to be taken with a grain of salt, perhaps several grains of salt. First, our experiences in understanding and acquiring corporate data have been humbling; understanding accurately the data within one company is quite enough of a job some days. Tying together data from a variety of different companies does not produce a feeling of confidence. Take turnover, for example. Within a given company, turnover data can be split into regrettable and nonregrettable turnover and further split into avoidable and nonavoidable varieties.⁶ Our experience tells us that identifying the nature of the turnover is crucial to corporate strategy, and this information may not be available or similar between companies. Furthermore, companies are not always willing to accurately report their data, for all sorts of reasons. Organizations also have very different philosophies and practices. We have worked with call centers that hired carefully and treated their employees well by offering quality grooming and training; this philosophy resulted in expensive employees, but ones who stayed with the company and performed at a high level. Other call centers with whom we have worked hired unselectively, paid low wages, cracked the whip, and hosed down the decks when employees didn't perform. Which of the two philosophies is preferable depends on the business strategies of the organization. Finally, there's just something intrinsically contradictory to us about aspiring to greatness by doing the same thing that everyone else does.

Correlations and causations are the next two stages in the continuum. We use these phrases in a way that we find comfortable but may not entirely agree with standard usage. "Correlations" we use to describe the descriptive statistics that might occur on a sophisticated dashboard. Where are sales highest? Did the trained employees outperform the untrained ones? These are rich data mines for understanding business resources and human capital.

Causation is the next level beyond correlation. We would like to have a nickel for every time we have repeated the phrase "correlation does not imply causation" around our offices. We hope it will continue to be repeated, to junior business analysts and freshmen, until the Earth quits turning on its axis. Newspapers and books are full of correlations, tying together every conceivable item to support policy

decisions. Umbrellas need to be banned because it ends up raining on days where everyone carries them. Ice cream sales and murder rates leap together in the dog days of summer. We like Cascio and Boudreau's three-part criteria of causation:⁷

1. Two events must show a clear and statistically significant connection,
2. One event must precede the other, and
3. All other plausible causes must be ruled out.

We view the final stage as optimization, the holy grail of HR measurement. Optimization is having the intelligence to understand where the impact is occurring. Optimization is intimately wrapped up with causation. Without understanding all of the factors that control impact, it is impossible to be sure that you have correctly assessed impact. The really positive side of having assessed and measured the different factors that control and mediate impact is that you can use them to control future impact and improve outcomes. If you have controlled and assessed the impact of the various factors, you are able to use them prescriptively. If you know how much tenure controls performance and how the various tenure levels benefit from training, the logical consequence is that you can now specify where training should be focused and what new programs need to be created for areas that do not show the benefits.

When we speak at industry events, we typically survey the audience on where its members are on this continuum. Based on our feedback, we believe most organizations are on the lower left of the continuum, obtaining information from their dashboards and scorecards. So, where is your organization on this human capital analytics continuum? This book will show you how to move up the continuum into the world of predictive analytics, enabling you to optimize your human capital investments.

There are, of course, other ways to talk about the continuum of human capital measurement. Several different measurement methodologies are particular to learning and development but have limitations when we apply advanced analytics to them. In developing our continuum, we are striving for a broader view of all human capital

investments, independent of learning and development. We think a broader view is necessary for HR.

The application of predictive analytics allows you incredible insights into your workforce and enables you to improve your HR investments, both financially and for your employees. In our first case study, Lowe's will show you the power of this work.

CASE STUDY

CONNECTING PEOPLE INVESTMENTS AND BUSINESS OUTCOMES AT LOWE'S: USING VALUE LINKAGE ANALYTICS TO LINK EMPLOYEE ENGAGEMENT TO BUSINESS PERFORMANCE*

The ability to formulate and implement strategy is one of the most important *and elusive* enablers of sustained organizational success. Successful strategy execution requires that the purpose and priorities of the organization be defined and the strategy and tactics for achieving them be clearly aligned.

Aligning strategy and execution is a difficult task for most businesses. Research indicates that 70% to 90% of organizations fail to realize success from their strategies.⁸ Human resource leaders, in particular, often find it difficult to strategically align and integrate their HR functional strategies, outputs, and measures to business priorities.

HR measures are typically cost-based, lagging metrics that either measure workforce-related expenditures (for example, headcount costs) or efficiencies in the HR function itself (such as position fill rates). Most HR executives lack forward-looking data that help drive business strategy. This puts the people agenda at a significant disadvantage when HR engages in strategy and execution discussions with other executives. Although there is general recognition that people truly are an organization's greatest asset, there seem to be limited ways to measure their activities effectively.

During the last 20 years, employee engagement has become generally accepted as one indicator of business performance. Applied correctly, engagement data can act as an early warning system for revenue and profits. The statistical relationship between engagement

*This case study was written by Cedric T. Coco, senior vice president, Learning & Organizational Effectiveness, Lowe's Companies, Inc.; Dr. Fiona Jamison, senior vice president, Research and Consulting, Spring International; and Dr. Heather Black, vice president, Research Analytics, Spring International. It was published in HRPS's journal *People & Strategy*.

and financial success has been shown in numerous studies. For example, in the report *Employee Engagement Underpins Business Transformation*, companies with highly engaged employees outperformed those with less-engaged employees in three key financial measures—operating income, net income growth, and earnings per share.⁹

However, there are two critical issues that are still keeping most organizations from measuring the actual financial impact of engagement on their bottom line. First, identifying the financial impact of engagement is, to date, mostly correlative—organizations know there is a connection but do not have sufficient cause-effect data necessary to make specific improvements for people or operational performance. Second, as a recent survey of HR leaders showed, companies that statistically test these relationships typically only examine relationships among different HR data points, rather than making linkages to non-HR data as well. In fact, only a handful of organizations link HR to financial or other non-HR data.¹⁰

In order to show how HR helps drive business strategy, the relationships of HR data point to other non-HR data metrics throughout the organization that must be measured. The statistical techniques must be sophisticated enough to show cause and effect, while managing the complexity of the organization's business processes.

Importance of Integrating Data

For many organizations, integrating HR, customer, operations, financial, and other types of data can be daunting. Barriers to conducting this type of analysis can range from simply not knowing all of the types of data the organization is currently collecting to dealing with incompatible or redundant systems housing the data, to data quality issues (information gaps) and issues in working across organizational silos.

In 2007, Lowe's began the journey to establish a data-driven, HR business model to show causal linkages from HR to business outcomes. Lowe's understood that employees are crucial to competitive advantage and could not accept that people were the largest single most unmeasured asset. Business leaders intuitively knew the relationships existed, but a proven decision model would help identify the people and HR priorities by showing which areas had the greatest business impact. Lowe's collaborated with an outside consultant to develop a systematic methodology for determining the impact of people on financial results.

Lowe's set out to create a value linkage decision model to define the causal linkages between people measures and key metrics, such as retail shrink (a retail metric related to inventory loss due to shoplifting, employee

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theft, or supplier fraud), revenue, and customer satisfaction. Lowe's used the methodology to link HR data (engagement surveys, turnover data, sick time, and so forth) to marketing data (customer satisfaction, loyalty, value, and so on), operations data (inventory shrink, safety, and so forth) and financial metrics (sales per square foot, net income before tax, and so on).

Step 1: Establishing Buy-In

For Lowe's, the first step was to establish executive buy-in. Human resources is the steward for many people decisions, but Lowe's objectives went beyond making HR more efficient or effective. Lowe's wanted to make better people decisions for the organization, not just better HR decisions. Lowe's had already seen the impact of its engagement work, and the HR leadership team championed linkage analysis as an extension of this work.

Yet from the beginning, Lowe's had skeptics about its ability to create a viable model to show the impact of engagement on the bottom line. The Lowe's HR team recognized early on in the process that a cross-functional team was required to build and achieve support for a linkage model. A cross-functional team was created with an emphasis on finance, market research, and operations to help build the model.

Beyond building the cross-functional project team, HR's primary role in the model development was to facilitate the process. HR's larger role for organization alignment would come after the model was built.

Step 2: The Discovery Process

The second step was to conduct a data audit and evaluation process starting with the employee attitudinal data from Lowe's employee engagement results. Establishing quality metrics is essential before embarking on any linkage analysis approach. For example, organizations cannot assume that simply conducting an engagement survey provides sufficient data to conduct a linkage analysis. Many organizations collect only a sample survey each year, may use a limited response scale (less than a five-point scale), and may not identify results by location or group or even distinguish results by manager and nonmanager. These components have been found to be very important for linkage analysis.

After assessing the employee opinion data and other data traditionally collected by HR, the project team turned its attention to the non-HR data. The team initiated a discovery process with the key holders of data—finance, marketing, customer service, business development, and operations—to find the metrics that are most relevant to the way Lowe's business operates.

Multiple meetings, facilitated by HR, were conducted during the course of a six-week period. In addition to gathering data, these meetings were important to establish credibility and buy-in. In the meetings, data holders had the opportunity to ask questions about how their information interacts with data from other parts of the company. Each meeting was designed to share purpose, establish “what’s in it for me” for stakeholders, identify data availability, clarify outcomes, and, of course, address the skeptics. Even with leadership buy-in and HR as the facilitators, gathering all of the data from multiple sources required both patience and persuasion.

At the conclusion of the discovery process, the cross-functional team developed a people value linkage blueprint to document the data that were available, evaluate the quality of the data, and provide a road map for the model (see Exhibit 1.2). This blueprint also captured all of the expectations, or hypotheses, from the key stakeholders. These expectations translated into various stakeholders’ perceptions. Some examples included the expectation that there would be a causal linkage between engagement and customer satisfaction and the expectation that the level of employee engagement would drive a reduction in accident and shrinkage rates. These expectations became the first set of hypotheses that the resulting models would measure.

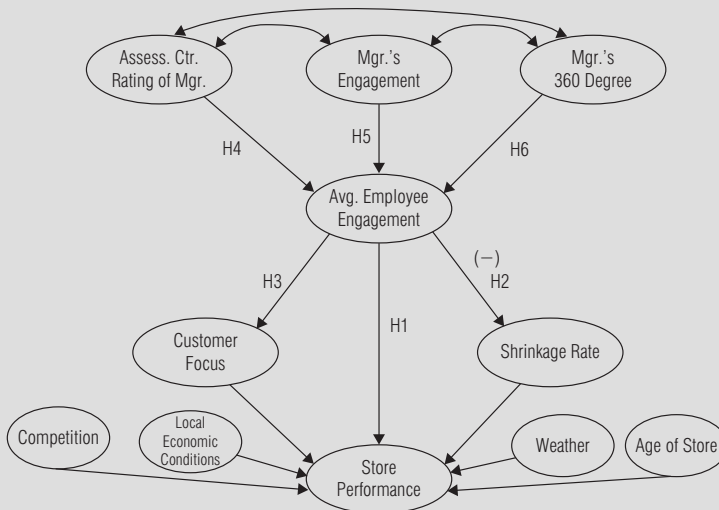


Exhibit 1.2 Lowe’s First Store Model Blueprint
 Source: Reprinted with permission from Lowe’s

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Step 3: Building behind the Firewall

Because most financial and operational data are too sensitive to take off site, the modeling itself took place within company firewalls with a two-part consultant analysis team consisting of a statistician and a business strategist. The combination of these two minds ensured that relationships tested in the model reflect both statistical accuracy and the reality of business.

The modeling process began with collecting all of these data from the various data holders in the several systems and cleaning it before merging it into one cohesive system. Lowe's included nearly 600 variables in the initial data set to be analyzed. The team used a combination of correlations, factor analysis, and regression to reduce the number of variables to the most predictive in each core area on the blueprint. For example, analysis determined which observed variables had the most predictive impact to be used to measure important metrics in retail, such as store performance and customer focus.

Structural equation modeling (a statistical technique that combines confirmatory factor analysis and path analysis) was then used to build and test the model created in the blueprint. Structural equation modeling is a deductive technique that tests a predetermined model. Most organizations have already chosen a structure and ways to interact within that structure to maximize business results. Decisions are made within organizations with express purposes. Deductive models allow organizations to test how well their structure and processes are working.

The process allows for revisions to the blueprint as variables are added or removed and for the testing of more than one model as new information is presented. The final model is constructed through creating different versions and testing each with different theoretical assumptions to look at new relationships that make sense in the context of the company. The model continues to be adapted until it reflects the best fit.

When the structural equation modeling process was complete, Lowe's had several core models that clearly delineated data correlations and causal linkages and the strength of those relationships (see Exhibit 1.3).

In this model, ovals indicate an item that is constructed of multiple variables, and rectangles indicate individual variables. Lines with arrows on both ends are co-varying relationships, meaning that the two items have an impact on each other. Lines with arrows pointing in one direction indicate that one item is affecting the other. The numeric values are regression error terms that show how much impact one item has on another (for example, if A affects B with a score of 0.14, then when A moves one unit, B will move 0.14). Positive values indicate that when one item goes up, the other item will

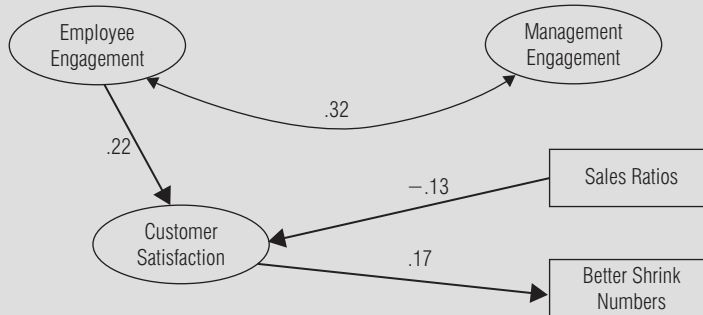


Exhibit 1.3 One of Lowe's First Core Models
 Source: Reprinted with permission from Lowe's

also go up. Negative values indicate that when one item goes up, the other item will go down.

Once the base models were established, Lowe's was able to quantify the results into tangible financial impact measures within the organization and then further refine the models over time with additional metrics and insights. In this stage, the models are used to answer critical questions, such as

- Training increases cost, but it also should influence efficiency. How does that play out in reality, based on a company's actual financial results?
- Leadership tenure and staffing levels should contribute to customer satisfaction, but do they?
- What is the most effective HR program or investment to increase customer satisfaction?

Step 4: Identifying Performance Themes with Executive Buy-In

On development of the initial models, the researchers and Lowe's HR team conducted a working session with the data holders to fully explore the implications and refine the model. The team validated the model and the results and then analyzed the data to make sure it was pulling out the right initial themes that existed across the enterprise.

Lowe's was careful to focus on key strategic themes to ensure that management would focus on business priorities with the follow-up engagement action planning. Once the themes were understood from an HR perspective, they were shared with the executive team. Through dialogue with the executive team, enterprise-wide themes were agreed on and then shared with each function (finance, operations, and so on).

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Although the executive team was supportive of value linkage's objectives, some questioned whether models could establish the cause-effect relationships. Because the models were built in concert with finance, operations, and research, the insights were acknowledged from functional stakeholders. This cross-functional design is essential to validity, as well as to acceptance. With this acceptance, Lowe's was able to use the models to prove a direct connection between engagement and customer satisfaction and the linkages to revenue, shrink rates, and a number of other areas.

Lowe's started the review and buy-in process with the HR leadership team, then with the executive staff, including the CEO, the functional leaders across the board, and then down to the workforce. The concept of working at the enterprise level helped to get agreement and work across silos.

The models were used to identify areas with the strongest relationships and greatest impact on Lowe's business priorities. These models became a foundation for prioritization of effort—influential in decision making for the HR team and operators within the organization. The models were then finalized, and the sharing and buy-in process across the organization began.

Step 5: Cascading Results and Taking Action

Many organizations find it difficult to disseminate value linkage data and results. The impact on performance is measured over time and is often part of a larger change initiative. A key success factor at Lowe's was sharing a combination of the visual models, simple charts and graphs and themes that represented the findings of the complex statistical models, and then communicating the findings in concrete financial measures that held meaning for key operators.

There are two ways to approach data sharing and follow-up. A functional approach allows individual business units to choose their own focus. An organizational approach looks at themes across the enterprise and provides direction to the functions. Lowe's chose an organizational approach to allow the time to educate the organization and business units on how to use the data and enhance control of the change process. In retail-focused operations—where operational excellence is a top priority—the tendency is to fix and deploy something as quickly as possible. Keeping the results at the thematic level within the enterprise ensured that the HR and operations components were created simultaneously to drive systemic and holistic change.

During the last five years, Lowe's has placed significant focus on employee engagement, and now it has permeated across the entire organization. Every business leader and each business unit believe in the

importance of engagement and want to know how their workforce perceives them. Employees want to know how the decisions and investments the organization is making affect not only themselves but customers and the corporate infrastructure.

Now at Lowe's, management teams are eager to receive their information and, in the spirit of healthy competition, are energized to raise engagement. HR continues to partner with management teams to help maintain focus on key areas with the greatest impact on both engagement and the business.

Step 6: Evolving the Model

Lowe's conducted employee research to ask the workforce for input, by theme, to determine what employees needed to drive engagement in these priority areas. Lowe's used its employee communication platform to collect employee input, as well as to communicate their engagement investments. In some cases, employees wanted changes that Lowe's would not be able to provide, and it was important to be transparent and show that the engagement priorities were aligned to the business priorities.

After Lowe's collected employee input for priorities and action planning, it continued to build out its linkage models with more data. Within Lowe's, the focus has also grown beyond employee engagement to begin testing the impact of other HR programs that were determined to be essential to enhancing engagement. HR programs that support leadership development, enhance work-life balance, and foster diversity and inclusion can all be built and tested within the existing models to see their impact on engagement and ultimately on the bottom line. With each new data set, new hypotheses can be tested and new relationships proved.

In addition, during the first year of modeling, Lowe's conducted quarterly stratified sample surveys measuring employee engagement that mapped to financial quarters. This enabled the analytical team to create models that could account for lags and leads and to determine which drivers and relationships stayed constant over time or weakened, based on changes in the economy and the market. For example, did increased engagement in quarter 1 lead to improved customer satisfaction in quarter 1, or did it lag until quarter 2? How long did the effects of increased engagement last? This quarterly approach to modeling throughout the operational and financial year enabled the analytical team to test for seasonality and ebbs and flows of sales that are common to the retail setting.

This approach helps determine questions that need to be explored further or new questions that need to be asked. The models are designed to be

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adapted and improved to reflect the constantly changing economy, work environment, market demands, and employee relationships.

Future Role for Value Linkage at Lowe's

Today, Lowe's has captured the impact of employee attitudes and how this affects the business—this is a milestone step for the HR business function. Lowe's is beginning to translate these models into forward-looking, predictive analytics.

Value linkage is a key step in the journey toward predictive analytics. Lowe's sees the next stage, which includes forecasting retention and productivity issues and the corresponding financial impact to make predictive investments for ongoing improvements. To reach this stage, Lowe's will need to continue to build out models with more details—market demographics, employee behavioral data, forecasts, and so on. Lowe's wants to know with a high degree of probability how the workforce will behave and the levers to pull for higher productivity—to predicatively analyze business from a human capital perspective.

SUMMARY

Human capital is the most important differentiator of a modern company. We are at a moment in time where theories about human capital, the amount of data available, and the computing power necessary to deal with the data are radically changing how business is done. We present the continuum of analytics, based on what we see in practice. All of analytics are useful: data ranges from anecdotes to hard operational data interpreted with statistics. Anecdotes add stories and context to your reports. Yet the rigorous analysis that provides true impact and helps you optimize your investments is the most important goal in the analysis of human capital. It is necessary to take your company into the next century.

NOTES

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