

## **SIMOPT-Reliability for Improved Workforce Planning**

*Fred Glover, Marco Better and James P. Kelly*  
*OptTek, Systems, Inc.*

*Gary Kochenberger*  
*University of Colorado at Denver*

### **Abstract**

Strategic Workforce Planning has a dramatic impact on both economic and social welfare. CEOs of major companies and institutions consistently identify “attracting, retaining and developing talent” as a top priority. To meet such goals requires accounting for a multitude of factors that affect the financial health and effective functioning of the organization and its employees alike.

Reliability plays a crucial role in handling such considerations effectively. However, a broader interpretation of reliability is required than customarily attributed to this term. *Reliability* in this broader sense refers to generating policies and decisions that account for global organizational consequences in the face of risk and uncertainty. In order to address the challenges posed by this perspective, and to handle the complexities of Strategic Workforce Planning, we employ a methodology that integrates the domains of simulation and optimization known as “simulation optimization,” and refer to the resulting more general form of reliability as *SimOpt-Reliability*. The underlying methodology is broadly applicable not only to workforce planning but also to traditional engineering reliability settings.

We describe an innovative tool for achieving SimOpt-Reliability in Workforce Planning called OptForce™ that fills the “analytics gap” in workforce planning. OptForce is currently used for workforce planning both in business and in the military, and constitutes a dramatic advance in strategic analysis and planning for large organizations,

### **Overview of the OptForce System for Workforce Planning**

Attracting, retaining and developing talent is a major challenge and a high priority for modern organizations. Success depends on having *the right people in the right place at the right time and for the right cost – a concept often called “readiness”*. The notion of *reliability* relates directly to *readiness* in the complex workforce planning setting, where risk and uncertainty play leading roles. To respond effectively under these conditions, solutions must be obtained that satisfy specified limits on deviating from ideal standards, while anticipating and rapidly responding to changing needs. The strategic importance of this capability was recently underscored by Brian Wilkerson, former Global Practice Director of Watson Wyatt Worldwide: “Workforce Planning has become the critical competency of top corporations—more than just an HR process, workforce planning has become a tool by which Operations unlocks real competitive advantage.” (Watson Wyatt, 2008 [1])

While effective workforce planning is pivotal for organizational success, few organizations manage it as strategically as they do their financial and physical assets, or their customer requirements. In most organizations, strategic workforce planning is in its infancy, and the tools and analytics used to support HR decisions are not nearly as advanced as they are in other

disciplines – e.g., there’s no equivalent of a cash flow model or operations plan. Yet the complexity of the workforce planning task is enormous! The pace of change within economies, industries and organizations continues to accelerate; labor markets continue to become more competitive and more global; the workforce continues to become more diverse in terms of its demographics, expectations and goals.

Advanced workforce planning and talent management tools are needed to enable HR to:

- Forecast human capital requirements (numbers, skill sets, locations, timing) given a range of possible business scenarios, and respond in real-time to changes in the assumptions behind those scenarios;
- Identify the recruitment channels that will be most effective in meeting those requirements;
- Forecast the impact of various HR programs/practices on attraction and retention, and identify how that varies based on demographics, job level, and performance;
- Model the impact of turnover and employee movement within the organization;
- Understand trade-offs between readiness and HR costs;
- Achieve objectives with respect to workforce representation;
- Quantify the financial impact of HR decisions.

OptTek, a pioneer and leader in the field of optimization for simulation, has developed a model called OptForce™ that enables organizations to optimize readiness (right people, right place, right time, and right costs) and representation (diversity of the workforce) within defined constraints (e.g., HR budget dollars, total compensation dollars, scarce skills.) The prototype for OptForce™ was created under a grant from the National Science Foundation.

At its core, the OptForce system consists of a simulation optimization process that makes use of agent-based modeling and data mining to effectively capture the flow of employees over a multi-period planning horizon. Sitting on top of the simulation model is an optimizer, OptQuest, designed to identify optimal decisions regarding recruiting activities and management policy choices, including reference to the elements of risk and uncertainty embodied in the complexities that underlie the more general view of reliability expressed in the term *SimOpt-Reliability*. Whereas traditional approaches limit their scope to projecting future workforce requirements based on static assumptions, OptForce provides decision making tools that support the development and implementation of strategies, programs and policies to meet those requirements.

The relevance and potential impact of this technology can be glimpsed by thinking of HR budget dollars as being allocated to buckets representing specific practices (policies, programs, initiatives, organizational culture) used to attract and retain valued employees. A dial is placed beneath each bucket that can be turned to increase or decrease the resources allocated to the bucket. The challenge is to manipulate all the dials in relation to each other to find an allocation of resources that is most likely to enable the organization to achieve specific goals (e.g., attraction, retention, readiness, and representation), while meeting constraints and accounting for the demographics of the employee population and the environment in which the organization

operates. The key question is: how can an optimal setting be determined for each of the dials, considering that the best choice for a given dial depends on the settings of the others while simultaneously responding to multiple marketplace conditions with their attendant uncertainties.

### **Primary Features of the OptForce System for Workforce Planning:**

Viewed as a whole, the strategic HR planning system embodied in OptForce constitutes a state of the art decision support system incorporating agent-based simulation and modern metaheuristic optimization tools (OptTek, 2010 [2]). The resulting system assists management in meeting the challenges of modern workforce planning by providing a variety of capabilities including

- Identifying the optimal set of investments in policies, programs, initiatives, and organizational culture used to retain valued employees
- Identifying the most effective recruiting channels for the organization
- Modeling the cost-effectiveness and risk of using contingent versus regular staff
- Supporting the budgeting process by defining and communicating trade-offs between readiness and costs
- Modeling the likely impact of total compensation strategies
- Identifying likely bench strength in key areas given workforce mobility
- Modeling workforce requirements and transitions following mergers and acquisitions.

### **Summary and Conclusions**

The innovative OptForce system is designed to support strategic workforce planning in large organizations by combining agent-based simulation and data mining to help identify optimal recruiting and HR policy decisions. Joining these features with special capabilities for handling risk and uncertainty [3] provides a tool for achieving the broader form of reliability embodied in the notion of *SimOpt-Reliability*. The OptForce system identifies optimal expenditures in recruiting channels and management policies and simultaneously meets readiness and reliability goals. Early experience with large organizations both in business and the military discloses that the model adds substantial value as a tool for high level workforce planning.

### **References:**

1. Watson Wyatt webcast: "Advanced Workforce Planning: Securing the Future," *Human Capital Institute*, November 20, 2008.
2. "Strategic Workforce Optimization: Ensuring Workforce Readiness with OptForce," White Paper, OptTek, Inc., 2010.
3. Better, M., F. Glover and M. Laguna, "Advances in Analytics: Integrating Dynamic Data Mining with Simulation Optimization," *IBM Journal of Research and Development*, Vol. 51, No. 3/4, 477-487 (2007)