

# SEAT-OF-THE PANTS-LESS

THE WORLD'S MOST SUCCESSFUL EXECUTIVES ARE MAKING BOLDER DECISIONS –  
AND RUNNING EVERYDAY OPERATIONS – WITH LESS RISK AND BETTER OUTCOMES.  
THE SECRET? **OPERATIONS RESEARCH: THE SCIENCE OF BETTER**



**“IT ALLOWED US TO SEIZE THE INITIATIVE  
IN THE MARKETPLACE. WE HAVE MOVED  
FORWARD LIKE A BULLET TRAIN AND  
IT IS OUR COMPETITORS THAT ARE  
SCRAMBLING NOT TO GET RUN OVER.”**

*Launny Steffens  
Vice-Chairman  
Merrill Lynch and Company*

# **OPERATIONS RESEARCH: THE SECRET OF BETTER DECISION MAKING IN A COMPLEX WORLD**

We all have to fly by the seats of our pants sometimes. But always? Executives in every kind of organization – large and small, private and public, for-profit and not-for-profit – are using operations research (O.R.) to unlock the value in their data, model complex systems, and make better decisions with less risk. Whether O.R. is used to inform high-level strategy or improve day-to-day operations, the results speak for themselves: Insight into difficult problems. Improved processes, productivity, and performance. Millions in cost savings and increased revenues. More (and better) options. Accurate predictions, plans, and forecasts. More profitable pricing. Greater market share. Higher quality. Superior ROI. Better asset utilization....

## **THIS GUIDE WILL GET YOU STARTED FAST**

In just a few minutes, you'll learn what you need to know about O.R. What it really is and why it's so powerful – **PAGE 2**. The kind of value it has delivered for others, and how to recognize your own opportunities – **PAGE 7**. How to find and work with the right O.R. professional – **PAGE 10**.

### **THERE'S MORE AT [WWW.SCIENCEOFBETTER.ORG](http://WWW.SCIENCEOFBETTER.ORG)**

You'll find dozens of O.R. success stories you can search by industry, functional area, or benefit delivered. You can also access tools for finding O.R. professionals and companies with the expertise you and your organization need.

The site – and this guide – were created for you by **INFORMS®**, the non-profit Institute for Operations Research and the Management Sciences. A primary part of our mission is helping executives like you use the power of O.R. to improve their organizations.

# WHAT IS OPERATIONS RESEARCH?

In a nutshell, operations research is the discipline of applying advanced analytical methods to help make better decisions.

By using techniques such as mathematical modeling to analyze complex situations, operations research gives executives the power to make more effective decisions and build more productive systems based on:

- More complete data
- Consideration of all available options
- Careful predictions of outcomes and estimates of risk
- The latest decision tools and techniques

## **A uniquely powerful approach to decision making**

You've probably seen dozens of articles and ads about solutions that claim to enhance your decision-making capabilities. You may not realize it, but the best of these solutions are based on O.R.

When it comes to technology that assists decision making, O.R. is unique. It's best of breed, employing highly developed methods practiced by specially trained professionals. It's powerful, using advanced tools and technologies to provide analytical power that no ordinary software or spreadsheet can deliver out of the box. And it's tailored to you, because an O.R. professional offers you the ability to define your specific challenge in ways that make the most of your data and uncover your most beneficial options.

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## CONTINENTAL AIRLINES SPEEDS RECOVERY AFTER 9/11

Operations research firm CALEB Technologies worked with Continental to develop a decision support system to generate near-optimal crew recovery solutions for responding to emergencies.

Continental estimates that the system helped it save \$40 million in 2001. And thanks to the system, Continental led the American airline industry in recovering operations after September 11, 2001.

Learn how Continental and others have applied O.R. to improve decision making while reducing expenses at [www.scienceofbetter.org](http://www.scienceofbetter.org).

**“OUR NETWORK SALES ORGANIZATION HAS SEEN FIRSHAND HOW OPERATIONS RESEARCH METHODOLOGIES CAN REVOLUTIONIZE HOW WE WORK. WE WILL CONTINUE TO DEPLOY THESE TECHNOLOGIES ACROSS ALL FUNCTIONS AS WE GROW AND IMPROVE OUR BUSINESS.”**

*Robert C. Wright  
Vice Chairman & Executive Officer, GE  
Chairman & CEO, NBC*

## WHAT IS OPERATIONS RESEARCH? (CONTINUED)

To achieve these results, O.R. professionals draw upon the latest analytical technologies, including:

***Simulation*** – Giving you the ability to try out approaches and test ideas for improvement.

***Optimization*** – Narrowing your choices to the very best when there are virtually innumerable feasible options and comparing them is difficult.

***Probability and statistics*** – Helping you measure risk, mine data to find valuable connections and insights, test conclusions, and make reliable forecasts.

### **Already at work around you**

O.R. has enhanced organizations and experiences all around us. From better scheduling of airline crews to the design of waiting lines at Disney theme parks. From two-person start-ups to Fortune 500® leaders. From global resource planning decisions to optimizing hundreds of local delivery routes. All benefit directly from O.R. Shouldn't you?

## 7 O.R. SUCCESS STORIES

O.R. consistently delivers significant value – strategic to tactical, top-line to bottom-line – to the organizations and executives who use it.

*A few examples:*

- 1** Sears used O.R. to create a vehicle routing and scheduling system to run its delivery and home service fleets more efficiently – for \$42 million in annual savings.
- 2** The Pentagon used O.R. to solve the massive logistical problems of supplying Operation Desert Storm, and to plan the successful liberation of Kuwait.
- 3** Ford used O.R. to optimize the way it designs and tests vehicle prototypes, saving \$250 million.
- 4** DIRECTV used O.R. to accurately forecast consumer adoption of satellite television.
- 5** UPS used O.R. to redesign its overnight delivery network, for \$87 million in savings between 2000 and 2002 and another \$189 million anticipated over the following decade.
- 6** NBC used O.R. to improve advertising sales plans, increasing revenues by more than \$200 million.
- 7** The City of New Haven, Connecticut used O.R. to determine definitively if its needle exchange program was reducing HIV infection rates.

**For dozens of O.R. case studies that you can search by industry, functional area, and benefit, visit [www.scienceofbetter.org](http://www.scienceofbetter.org).**



# WHAT OPERATIONS RESEARCH CAN DO FOR YOU

Organizations and the world in which they operate continue to become more complex. Huge numbers of choices and relentless time and margin pressures make the decisions you face more daunting and more difficult. Meanwhile, new enterprise applications and software are generating massive amounts of data – and it can seem like an overwhelming task to turn that data into insight and answers.

But all that data and the availability of more and cheaper computing power are creating an important opportunity for decision makers, one O.R. is ideally designed to help you take advantage of. O.R. professionals thrive on challenges that involve large numbers of variables, complex systems, and significant risks.

## **Identifying your O.R. opportunity**

Begin with a general review of your organization, its departments, and its processes. Look for difficult decisions that could benefit from the analysis of large amounts of data – like where to locate a new plant or how to make a manufacturing process more efficient. Look for complex processes that are being performed manually or with outdated systems. Look for decisions that are made routinely and might benefit from automation.

Are you gaining the most from your supply chain, logistics, or ERP system? Your manufacturing processes? The way you deliver your services, set your prices, or evaluate your portfolio? These are all areas where O.R. can help you make significant improvements.

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## PSA PEUGEOT CITROËN SPEEDS UP PRODUCTION

To meet the CEO's ambitious new targets for growth, innovation, and profitability, the O.R. team at PSA Peugeot Citroën focused on improving production line efficiency in its plants' car body shops.

The O.R. tools they developed improved throughput with minimal capital investment and no compromise in quality – contributing \$130 million to the bottom line in 2001 alone.

Learn how Peugeot and others have used O.R. to improve workflow and production at [www.scienceofbetter.org](http://www.scienceofbetter.org).

## 5 signs you could benefit from operations research

**1. You face complex decisions.** Are you faced with more decision factors than you can get your arms around? Do your key operational information systems lack intelligence? O.R. professionals can analyze complex situations and build intelligence into key systems, so as to reveal the truly best options. But before you act, talk with an O.R. professional to confirm that taking an O.R. approach will pay dividends.

**2. You're having problems with processes.** One or more of your processes is broken or needs to work a lot better. Many small, day-to-day decisions are not being made well, and it's having an impact on your bottom line. O.R. can help improve these processes and their outcomes dramatically.

**3. You're troubled by risk.** Do you want to limit or reduce risk? Assessing the risk of a new project or contract can be tricky. O.R. can help you quantify risk, which is key to controlling it. O.R. professionals can assist you in planning how best to balance risk against the gains you expect.

**4. Your organization is not making the most of its data.** Do you track information about your organization and have data that is begging to be used for decision making? O.R. specializes in working with data – extracting the most valuable information from what's currently collected, and showing what additional data you could collect to increase the value even further.

**5. You need to beat stiff competition.** Others in your field are probably already using O.R. to gain competitive advantage. Can you afford not to? An O.R. professional can help you stay on top with the latest methods – and open up important new sources of advantage.

# START BENEFITING FROM OPERATIONS RESEARCH NOW

No matter what size or at what stage your organization is, no matter what kind of decision, problem, or opportunity you face, there's likely a way for O.R. to help. And the sooner you make O.R. part of your decision-making processes, the more far-reaching the benefits can be.

## **Finding O.R. expertise**

There's more than one way to engage O.R. professionals who have the expertise you need.

***Inside your organization*** – You may already have employees with O.R. training in one or more departments – engineering, R&D, IT, scheduling, planning, logistics, pricing, etc. If you don't, consider hiring an O.R. professional and adding him or her to the mix, or even creating a new department.

***Outside your organization*** – There are many qualified O.R. professionals offering their services as independent consultants or members of consulting firms. There are also companies delivering O.R. solutions like optimization software and services. You can find them in the O.R. resource databases at [www.scienceofbetter.org](http://www.scienceofbetter.org).

***Inside and outside*** – Combining both internal and external resources has its advantages. You can leverage external specialties beyond your own resources, while building solution and system expertise internally for long-term support after the outside resources have moved on.

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## BRITISH TELECOM SAVES \$150 MILLION A YEAR

To improve workforce scheduling for thousands of field engineers, the O.R. department at BT developed information systems with “O.R. inside” to automate work management and field communications.

Rolled out in 1997, the system was saving BT \$150 million a year on operational costs by 2000. When deployed over the targeted workforce of 40,000 people, the system is projected to save \$250 million a year.

Learn how British Telecom and others have optimized resource use and achieved greater efficiency at [www.scienceofbetter.org](http://www.scienceofbetter.org).

## Working with an O.R. professional

The four basic phases of typical O.R. engagements are described below. You'll also find a 90-day plan for putting O.R. to work at [www.scienceofbetter.org](http://www.scienceofbetter.org).

### ***Step 1: Assessment (1 day to 1 month)***

Start by calling in an O.R. professional to assess how O.R. might help you address your challenge or opportunity. Depending on the subject matter, you may accomplish this step with a conversation or an assessment study.

### ***Step 2: Quick-turn-around analysis (1 day to 2 months)***

If you and the O.R. professional agree to proceed, the next steps are determined by the nature of the assignment. Some examples:

- *Critiquing technical material or evaluating a software package with "O.R. inside":* The O.R. professional performs the work and reports the results.
- *Advanced analysis for a one-time, critical decision:* The professional prepares and interprets an advanced analysis, in ongoing interaction with you and others who either furnish input or participate in the decision.
- *Preparing for system development to improve recurring decisions:* The professional designs an information system with "O.R. inside" to identify preferred choices on demand.

### ***Step 3: Prototyping – for system development only (1 month to 3 months)***

A development team (including O.R. professionals, software engineers, and operations staff as required) is assembled. The team constructs, tests, and refines a system prototype while interacting frequently with prospective users. The O.R. professional also recommends changes in processes and procedures needed for effective system performance.

### ***Step 4: Implementation – for system development only (1 month to 1 year)***

The development team works with management and users to finalize development, install the system, train operators, revise processes and procedures, provide for maintenance and future upgrades, and measure benefits.

**MORE QUESTIONS ABOUT  
OPERATIONS RESEARCH?**

**VISIT [WWW.SCIENCEOFBETTER.ORG](http://WWW.SCIENCEOFBETTER.ORG)**

Or contact INFORMS at 1-800-4INFORMS.

Pass this executive guide on to management at senior and middle levels in your organization, and to any others who should know about the benefits of operations research.

For additional copies of this guide, visit [www.scienceofbetter.org](http://www.scienceofbetter.org) or contact:

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# **OPERATIONS RESEARCH**

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