



# Agile Forecasting® & Integrated Business Planning

## CPDF® Certified Professional Demand Forecaster Workshop

### Key Learning Objectives:

1. Establish a framework for demand forecasting in the supply chain
2. Introduce a four-step process for streamlining the forecasting cycle
3. Define, interpret, visualize major demand forecasting techniques.
4. Identify appropriate accuracy measures for evaluating demand forecasting and forecasting models.
5. Complement established approaches with non-traditional methods in forecasting model development and evaluation



Program is endorsed by  
International Institute  
of Forecasters (IIF)

## Day 1

### Part 0 - Pre-course Computer Workshop

### Part I - The Demand Forecasting and Planning Cycle in the Consumer Demand-Driven Supply Chain

What is demand forecasting?

Demand Forecasting and the Supply Chain Paradigms

Who will use the forecast and what are their data needs?

Forecasting as a structured process- The PEER Model

**Workshop A:** Defining the Target- How to Quantify Drivers of Demand for New and Existing Products and Services

### Part II - Improving Data Quality through Data Exploration and Visualization

Data exploration- Learning from actual examples

Judging the quality of data

Handling unusual events and outliers

What are forecasting models?- Quantitative vs. qualitative methods

Evaluating forecasts and forecasting models

Combining and reconciling the final forecast

**Computer Workshop B:** Exploring Trend and Seasonal Variation.

### Part III - How To Use Components of a Time Series

Moving averages for smoothing kinks out of data

Finding the lift in promotions with moving medians

Identifying day-of-week effects through ANOVA methods

Creating additive and multiplicative seasonal factors

Seasonal adjustment of time series

**Computer Workshop C:** Creating Seasonal Adjustments and Projections with the RMA Decomposition Technique.

### Part IV - Forecasting with State Space Forecasting Models

Why use Naïve forecasting techniques?

Types of smoothing weight

Forecasting profiles for exponential smoothing

Applying univariate time series techniques

Handling special events with exponential smoothing model

Scenario forecast

Product lifecycle

**Computer Workshop D:** Trend/ Seasonal Baseline Forecasting with Automated, State Space Forecasting Models

## Day 2

### Part V - Big Data: Data Mining, Data Exploration and Data Quality

Predictive Analytics- something new?

Methodologies for big data exploration

Basic statistical tools for summarizing data

Traditional and nonconventional measures of variability

Data framework for demand forecasting in the cloud

Identifying criteria for assessing data quality

Handling exceptions in large data sets

Data process frameworks and job checklists

**Computer Workshop E:** Data Exploration, Outlier Correction, and Predictive Analytics

### Part VI - Forecasting with ARIMA Time Series Models

Creating a flexible model building strategy

Detecting autocorrelation in time series

Identifying seasonal and non-seasonal ARIMA models

Diagnostic checks and ARIMA modeling checklist

**Computer Workshop F-** How to Create Short-term Trend/Seasonal Models

### Part VII - How to Measure Forecast Accuracy

Basis of accuracy measurement- Bias and Precision

Forecasting errors and waterfall charts

Goodness of fit versus forecast performance

Cost of inaccurate forecasts

Traditional and conventional accuracy measurement

**Computer Workshop G-** Root Cause Analysis and Exception Reporting

### Part VIII - Graphical Tools for Forecast Process

Ladder charts for monitoring forecast modeling results

Prediction- Realization diagrams and business cycles

Prediction intervals for controlling judgemental overrides

Cumulative tracking signals- Trigg's approach

**Computer Workshop H-** How to Use Predictive Visualization To Track and Monitor Forecasting Performance

### Part IX - Implementing the Demand Forecasting Function Within an Integrated Business Planning Process

The Delphi Method

The forecasting audit

A framework for setting forecasting standards

Planning for process improvement

Overcoming barriers and closing gaps

### **Part X – Practical Uses of Demand Forecast Modeling**

Marketing– Promotion planning  
Sales– Pricing: Elasticities  
Operations– Safety stock and inventory forecasting  
Finance– Rolling forecasts and budgeting

### **Computer Workshop I: Using a Time-phased Order Forecasting Model for Customer Replenishment Planning**

### **Part XI – Designing Regression Models for Demand Forecasting**

Finding a linear association between two variables  
Checking ordinary correlation with a nonconventional alternative  
What are regression model assumptions?  
What is a “best” fit?  
The least square assumption demystified  
The ANOVA table output for regression analysis  
Paring the output for use in forecasting  
Creating forecasts and prediction limits

### **Computer Workshop J– Using Causal Models for Advertising and Promotion Analysis**

### **Part XII– Taming Uncertainty— Root Cause Analysis and Exception Handling**

Dealing with lack of normality in time series regression modeling  
Looking out for “Black Swans”  
How good was the fit and what does it say about forecasting ?  
Dealing with nonrandom patterns in residuals  
Impact of error term assumptions on prediction interval determination  
Creating prediction intervals for forecast monitoring  
Using prediction limits for quantifying uncertainty in forecasts  
A checklist for multiple linear regression

### **Computer Workshop K - Working with Residuals and Forecast Errors to Improve Forecasting Performance**

### **Part XIII - Improving Forecasts with Subjective Judgment**

When to make judgmental adjustments to forecasts  
Judgmental traps in forecasting  
Melding quantitative and qualitative approaches for forecast development and process improvement  
Creating the final forecast with Change and Chance numbers

### **Computer Workshop L– GLOBL Case: Simulating The Demand Forecasting Cycle (You may bring your own data).**

Global Electronics Manufacturer (a fictitious company) provides consumer electronic technology products to a broad range of customers worldwide  
Participants will evaluate and reconcile forecasts and prediction limits for three product lines based on univariate exponential smoothing and multiple linear regression models.

## Day 4

### **Part XIV - A Database Framework for Creating a Forecast Decision Support System**

Ways to characterize demand

- Types of activity being forecast
- Budget data for a rolling forecast
- Lead –times and rolling forecast horizons
- The on demand dashboard and forecasting system
- Who is the customer?: Determining forecasting requirements by organization
- Internal factors likely to influence forecast
- Establishing a database framework for efficient storage and retrieval of data and information

**Computer Workshop M** – *Understanding the Data Structure in the Rolling Budget Forecasting Game*

### **Part XV – Creating Automated Baseline Forecasts for a Budget Forecast Planning Cycle**

- Improving the quality of data in preparation of a statistical forecast
- Selecting the appropriate aggregation level at which statistical forecasting engine to create unconstrained rolling baseline forecasts
- Allocating unit and revenue forecasts to lowest levels: SKU and Customer/Locations
- Recognizing the implications of making subjective judgments and overrides to multi-level forecasts

**Computer Workshop N:** Automated, Trend/ Seasonal Forecasting with Exponential Smoothing Models

## Start of Competitive Forecasting Game

### **Part XVI– Goals and Objectives of the Demand Forecast Simulation Game**

- Define the objectives of the forecasting cycle
- Recognize the drivers of demand
- Create a rolling baseline forecast for a multi-period forecast horizon
- Evaluate forecasting performance over the horizon with multiple metrics
- Recognize and document adjustments and overrides necessary to reflect changes in the business environment and updated assumptions
- Re- forecast for another multi-period horizon

Re-evaluate forecasts (CHANGE), associated prediction limits (CHANCE), and base assumptions and a rationale for advice to management and forecast users

**Computer Workshop O** –Overriding Baseline Forecasts With Informed Judgment

## Day 5

### **Part XVII– Bias and Precision: Establishing Forecast Error Metrics with Statistical Models**

- Defining Bias and Precision as the basis for determining forecast accuracy
- Interpreting prediction limits in statistical models
- Identifying accuracy measures for evaluating demand forecasts
- Defining Key Performance Indicators (KPI) for uses of forecasts

## Submission of Third and Final Rolling Forecast

## Management Presentations by Teams

### **Part XIII - Recap of Simulation Game**

#### **Presentation of Game Awards**

#### **Workshop Takeaways and Closing Remarks**

Each Level of the CPDF program consists of both instructor-led workshop training hours, and independent hours to be accomplished through self-paced e-learning environment. The successful completion of each level will qualify participants to earn a certificate, CPDF levels & certificates are described below:

**CPDF I Level : Certificate in Demand Forecasting**

90 Training Hours	15 hours hands-on workshop
	75 hours, 6 work sheets E-learning

**CPDF II Level : Certificate in Demand Forecasting**

60 Training Hours	15 hours hands-on workshop
	45 hours, 6 work sheets E-learning

**CPDF III Level: Certificate in Demand Forecasting**

50 Training Hours	20 hours hands-on workshop
	30 hours, 6 work sheets E-learning

**Program Requirements:**

- College degree or Job experience
- Reasonable experience in MS Excel
- Acceptable level of English language

**Program Assessment:**

- Full attendance of hands-on workshops is required
- Successful submission of required worksheets through e-learning system
- CPDF is not a test-based program.

**It's a hand-on workshop. Please bring your own laptops to run the computer exercises!!**



**Who Should Attend?**

- Demand Forecasters
- Operations Specialists
- Demand planners
- Supply planners
- Production Managers
- Operations Managers
- Financial analysts
- Market analysts
- Researchers
- Forecasters
- Economists
- Strategists
- Marketing & Sales managers

**WHY STUDY WITH US?**

1. International trainers
2. Trainers have long and global experience in demand management and forecasting.
3. High quality and excellent style of delivery with participative debate and discussion, case studies.
4. E-learning service through a unique Online Web Platform designed exclusively for CPDF Students.
5. 100% Student pass rate, endorsed by past and present students in the region.
6. Abilities to enhance local demand data with international experience and theories.
7. Interchange demand forecasting experience management with local culture and knowledge.

## Our Training Partner

# DELPHUS

Delphus Inc. ([www.delphus.com](http://www.delphus.com)) is a privately held corporation, headquartered in Morristown, New Jersey. Established in 1987, the company has been dedicated to providing strategic market analyses, forecasting software tools and data mining solutions for sales and marketing managers, inventory and production planners in manufacturing, distribution, retail firms and hospital management operations. Delphus clients list contains names like: Kodak, Lucent Technologies, IBM, TAP Pharmaceutical, Pfizer, and more.

## Program Leader

**Dr. Hans Levenbach** is the founder and President of Delphus Inc., which specializes in predictive-analytic solutions for demand planning in supply chain organizations. He is also an elected Fellow, former President and Treasurer of the International Institute of Forecasters (IIF). He is also a member of APICS, INFORMS, American Statistical Association and an elected member of the International Statistics Institute. Hans has been instrumental in designing and delivering the "Certified Professional Demand Forecaster" (CPDF<sup>®</sup>) curriculum ([www.cpdftraining.org/curriculum.htm](http://www.cpdftraining.org/curriculum.htm)).



He is the author of the book: **Change & Chance Embraced: Achieving Agility with Demand Forecasting in the Supply Chain**

## What is CPDF<sup>®</sup>?

This is a certification program for demand forecasters and planners working in supply chain industries. The International Institute of Forecasters (IIF), a non-for-profit membership organization founded in 1980 whose aim is to advance knowledge and research in forecasting, has endorsed it. The CPDF program is a 200 hours curriculum comprised of three modules, CPDF I, CPDF II, and CPDF III. Certification can be earned at each of the three levels. The CPDF qualification will address multidimensional job roles in demand forecasting such as data display and validation, database management, dashboard display, understanding quantitative and qualitative projection techniques, model creation and execution, forecast accuracy measurement, model and forecaster performance analysis, organization, and collaborative planning.

## How to Register?

**E-mail:** cpdftraining@delphus.com

**Web :** [www.cpdftraining.org](http://www.cpdftraining.org)

**Phone:** +1 973 267 9269

## Program Fees Available on Request:

5 Day combined Hands-on  
Workshop

E-Learning Exercises

Program Fees cover workshop manual, FREE Excel Add ins, FREE book: Change & Chance Embraced: Achieving Agility with Demand Forecasting in the Supply Chain., and coffee/tea breaks with lunch.

## Group and Early Birds Discounts Available

**Registrations are made on first-come first-served basis**

## Participants Information

1. Name:.....  
Company:.....  
Job Title:..... Email:.....  
Tel:..... Fax:..... Mobile:.....
2. Name:.....  
Company:.....  
Job Title:..... Email:.....  
Tel:..... Fax:..... Mobile:.....

## Registration and Payment

The registration form and fees are available from the Venue Partner or visit  
[www.cpdftraining.org/registration.htm](http://www.cpdftraining.org/registration.htm)

## Cancellation Policy

Participants can cancel their registrations 15 days before the beginning of training for a full refund. If the participant cancels their registration within 15 days before the start of training, 50% of the registry fee is refunded. However, there is no refund if the participant cancels within one week before the beginning of training. The training program can be postponed or cancelled for justifiable reasons by the Venue Planner. If the training is cancelled, then the full registration payment will be refunded.

**Interested to run  
this Program in-house?**

**Contact:** [cpdftraining@delphus.com](mailto:cpdftraining@delphus.com)