**Demand Analysis at Dell  
(adapted INFORMS Case Study)**

**ITEC-620**

**The Problem**:

For many years, Dell dominated the home desktop computer market with a revolutionary business model: their computers were not sold in stores. Instead, they used a direct sales model. Customers were able to custom-design computers on Dell’s website; after a computer was ordered, Dell would build it and deliver it to the customer. Dell built computers only after they were ordered. This allowed them to avoid all of the costs associated with operating retail stores. In addition, they never built a supply of a product that exceeded the demand. At the time, this model proved to be far more cost-effective, and computer buyers appreciated being able to configure their own desktops and order from home.

Unfortunately for Dell, changing market dynamics, technological advancements, and their own global expansion made the implementation of the direct sales model increasingly challenging. Notebooks, which are harder to custom-build, became more popular. Customers increasingly wanted to be able to see and feel a device before purchasing it. Dell also wanted to be able to take advantage of ocean shipping routes, which are low-cost but slow, and much better suited to bulk deliveries. Therefore, Dell embarked upon its transformation by offering fixed configurations through online, retailer, distributor, and other partners.

Developing the right product offerings was a significant phase of this process. The key challenge was to determine the best possible configurations among millions of possible combinations.

**Your team is responsible for determining a set of computer configurations to produce. You will be given a dataset containing the specifications for 2450 computers ordered by customers via Dell’s website[[1]](#footnote-1). There are four variables: hard drive size (GB), RAM (MB), processor speed (GHz), and monitor size (inches). Use R to cluster this dataset, and recommend a set of computer configurations. You will have to try several different values of *k* to compare results. Remember that there is no single “correct” number of clusters!**

**State each configuration clearly (e.g. “200 GB hard drive, 512 MB RAM, 3 GHz processor speed, 21-inch monitor”). For the sake of this activity, you can ignore practical restrictions about what values these variables can take on (e.g. you can use values of RAM that are not powers of 2). When you are finished, fill out the table in the “Dell Case Recommendation” PowerPoint file and email it to me.**

**The Analytics Solution**:

Dell used several analytics techniques in this process, one of which was demand cluster analysis, identifying naturally occurring demand patterns in billions of historical transactions. While the number of possible configurations of each product is enormous, the overwhelming majority of these configurations were simply not being requested by customers. Applying analytics methods to the demand data allowed Dell to determine a small number of specific configurations that would, as a set, lead to higher customer satisfaction in general.

In addition to demand cluster analysis, Dell has leveraged analytics to improve several other business functions, including pricing, marketing, support, and supply chain design.

**The Value**:

Analytics has solved complex business problems across channels and facilitated Dell’s growth in the fixed configuration business from $0 to $15 billion in just five years. In two years following their implementation, these analytics solutions have saved more than $140 million through reduction in markdown expenditure, improved marketing communication, increased ocean shipment, and improved customer satisfaction. The success Dell has experienced in these transformational initiatives has strengthened confidence in the resolution of complex business problems through analytics. It has also helped create a culture of data-driven decision making in the organization.

1. (The dataset has been condensed for the purpose of this exercise.) [↑](#footnote-ref-1)