

# Driving Innovation

**In this high-pressure business simulation, students learn new product development by competing against other teams to design and market a self-parking model car.**

**by Keith Goffin  
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**N**ew MBAs often join the workforce to find themselves managing some form of new product development. Not only do they need a theoretical understanding of the issues involved, they need specific skills in making design decisions, achieving effective cross-functional teamwork, and meeting tough deadlines. On the job, it might be months or even years before a manager finishes a complete project cycle and gains useful experience in new product development (NPD). How can some of that learning be distilled—and accelerated—in the classroom?

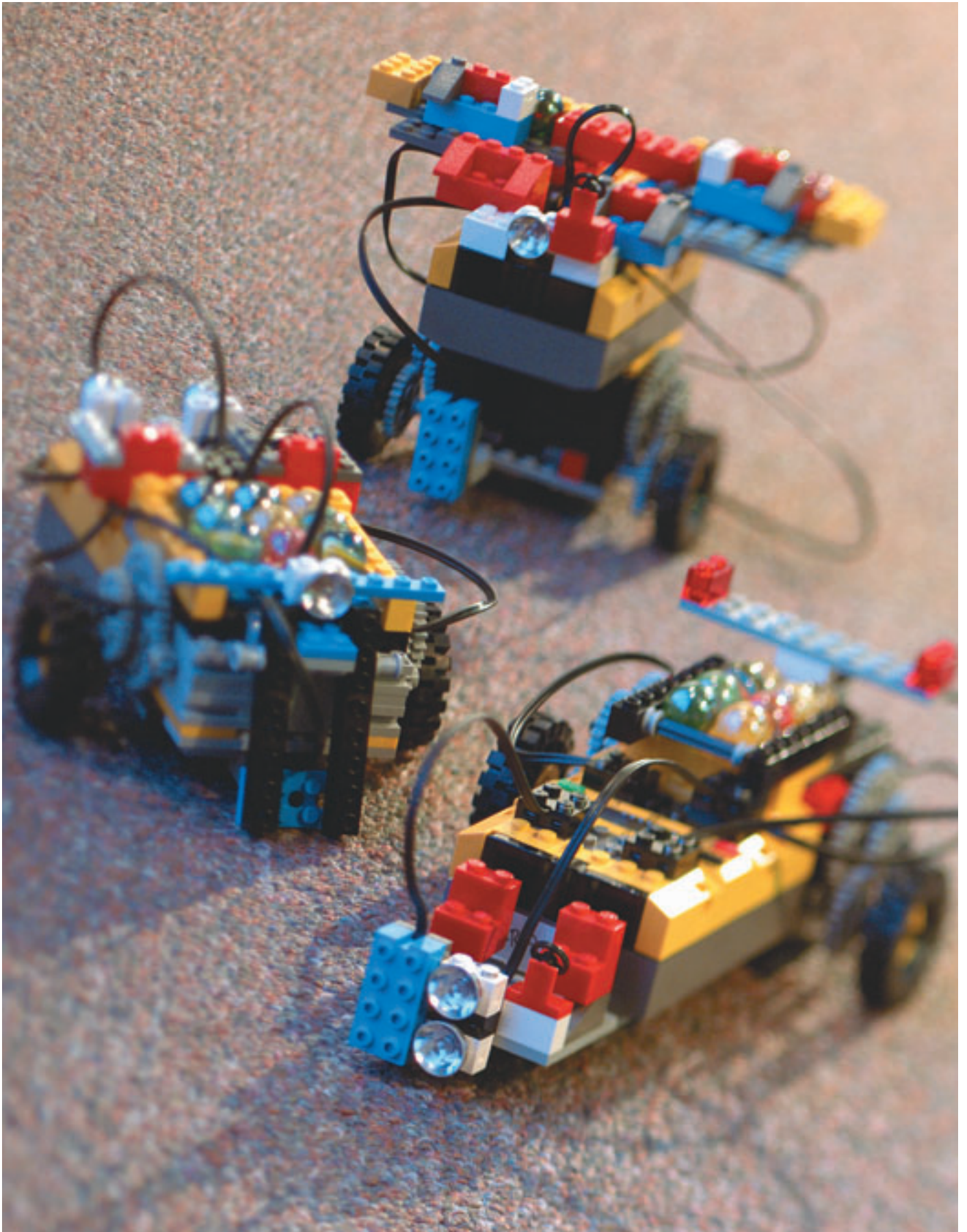
At Cranfield University in England, we have developed a business simulation technique that allows students to experience the new product development cycle over the course of a day. The Cranfield CityCar simulation was designed three years ago, based on research we did to discover what R&D managers explicitly and implicitly believe they have learned from their own NPD projects.

During the first half of the simulation, students develop their product and bring it to market. In the second half, participants analyze and discuss their results, then hear short presentations on the theories and practices of new product development. The Cranfield CityCar project essentially offers on-the-job training in a controlled atmosphere and compressed timeframe, and it works equally well for MBA students and business executives.

## **Teams Under Pressure**

In the CityCar simulation, five or more teams of six people each approach the problem of launching a new product—a car made of Lego pieces and controlled by complex software. Each team assumes it is a startup financed by venture capital, which means it has limited financial resources. Within a tight timeframe, the team members must perform research and development to identify customer needs, design the car, program it, test it, and market it. They also must prepare a manufacturing strategy and a sales plan. And they must do all this in just three hours.

At the beginning of the simulation, each member of each team is assigned one of six roles. These roles cover the functional disciplines: marketing, R&D for hardware, R&D for software, manufacturing, finance, and general management. A two-page briefing sheet helps each team member understand his or her role. For example, the marketing person is





MBA students at University of Kentucky's Gatton College of Business and Economics in Lexington participate in the CityCar simulation as part of the school's New Product Development Module. The simulation is run by representatives of Cranfield School of Management.



responsible for collecting and analyzing market data. To maximize the learning opportunity, team members are encouraged to take positions with which they are unfamiliar. Someone with marketing skills might become responsible for software, while a finance expert might manage marketing activities.

Those who take on the engineering responsibilities must design the car and master the software. They use Lego RCX software and an RCX “robot brick” that can be quickly learned and programmed with a laptop. They must produce a car that can drive forward, reverse into defined spaces, and recognize road markings. Each CityCar also needs to park automatically, thereby meeting the demands of customers who live in cities where parking is always a problem. Additionally, the product must be aesthetically appealing to succeed in the competitive market.

While some students are working on design, the team members in management roles must ascertain customer needs. These students make sure the product matches these needs while meeting the financial targets their backers demand. All teams are given some preliminary market information and—if they have the budget for it—they also can “buy” market research reports. These managers must decide realistically what the team can achieve before making any promises, so they must make difficult choices about product features, pricing, and time-saving measures. Concurrently, the marketing personnel must put together a coherent presentation and product demonstration that will convince customers this is the car to buy.

The pressure is high, not only because the timeframe is so short, but also because each group is competing directly with other teams. This competitive environment introduces a large element of risk to the project.

### **The Market and Its Lessons**

When the three hours are up, the teams take their products to market by introducing them at the Geneva Car Show. There, each team has five minutes to present its product to the customers and the press. Team members describe the car's ben-

efits, name its price, and demonstrate its features. They also get their first chance to see how successful their competitors have been at designing cars of their own. The performance of the cars is judged by “guest customers,” who critically compare the products offered by the various teams and then make their purchasing decisions.

Typically, teams display a wide range of performance levels. Top teams accurately assess market needs and develop a car in time for the Geneva Show. Other teams are less successful in meeting marketing needs or solving the many technical problems associated with the product—a situation that accurately reflects many of the issues faced in real product development. Some teams fail to even make a profit, as they have insufficient margins or do not receive enough orders at the Geneva show. Therefore, just as in real life, many product launches in the CityCar project end in failure.

While the Geneva Show is fun for the teams, it also is directly responsible for teaching them specific lessons, all of which are covered again during the debriefing sessions that come next. After the hectic pace of the new product launch, we slow down to allow teams a few hours of reflective learning time.

All teams—even those “winners” who made a profit—now analyze what they did well and what they would do differently if they were developing a new product in the future. When the CityCar simulation is conducted for MBA students, a number of learning points must be covered, since few students have experience of the complete NPD cycle. When such a simulation is conducted for corporations, the teams are encouraged to examine the similarities between the simulation and the difficulties with product development at their own companies.

After each team has had a chance for reflection, we hold a plenary session to collate ideas from all participants. Here, we have several learning objectives. We want participants to understand the role of communication, the process of decision making on product features, and the necessity of trade-offs between price and design. We also want team members to learn how to analyze risk, which is an inevitable part of

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innovation management. When participants discuss the approaches adopted by different groups during the simulation, they can perceive what impact such approaches have on any new product development.

This period of analysis mimics the so-called “post-product reviews” that major companies hold after they have developed new products. Such reviews allow manufacturers to extrapolate lessons they can apply when they develop new products. In fact, there is a whole body of emerging literature on how to use post-product reviews in R&D. One key factor that is often stressed is the importance of having a good moderator to lead the discussions and make sure all team members contribute their observations. In team discussions after the CityCar simulation, we also believe a good moderator is crucial for promoting student learning, so this role is discussed and assigned to one of the participants in each of the teams.

### Optimizing NPD

The CityCar simulation is not complete without the teaching element, which follows the period of discussion and analysis. At this point, we present theories and best practices used in NPD, drawing much of our material from our recently published textbook, *Innovation Management*. We cover the following topics:

- How to set clear project goals and use appropriate tools, including the Work Breakdown Structure. This process requires a manager to list all the tasks associated with a project, the relationship between them, the time it will take to complete them, and who will be responsible for doing them.
- How to foster communication and quickly achieve effective teamwork.
- How to manage risk in relatively simple ways.
- How to focus on real customer needs by identifying the “voice of the customer.” Students are introduced to the Kano model product for evaluating product features, which explores how specific features lead to customer satisfaction.
- How to manage and improve the NPD process itself.

The simulation has just given students a “live” chance to

experience the challenges of new product development. These teaching sessions help them see clearly how to apply key tools, techniques, and best practices in their own companies.

### Tailored to the Audience

Since the simulation was developed, it has been administered to more than 2,000 individuals—top executives at major corporations in addition to MBA students in Europe and the U.S. Executives find the simulation useful because it helps them focus on research and development while improving communication between functional areas. In addition, the simulation encourages organizations to move away from a strict focus on product innovation—what is sometimes called product myopia—and take a broader view of innovation. It also emphasizes the need to constantly evolve product offerings.

Depending on the needs of the audience, the emphasis of the simulation can be changed. In a typical simulation, the key learning points are employing cross-functional teamwork, identifying breakthrough customer needs, and managing risk. In other situations, we might introduce surprises, such as major changes in the market or the availability of resources. At times, corporations might want the simulation to contain a stronger focus on understanding the market or making cross-functional decisions.

The simulation has been extremely successful in its current form. However, we must practice what we preach and not forget that product features need to adapt with time. Therefore, we are currently working on an improved and updated version of the simulation. We must keep in mind the lessons we teach our students: Any product brought to market must meet a budget, adhere to time constraints, and evolve to match customers’ ever-changing needs. **Z**

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