

## Rebuilding Lego, Brick by Brick

by Keith Oliver, Edouard Samakh, and Peter Heckmann

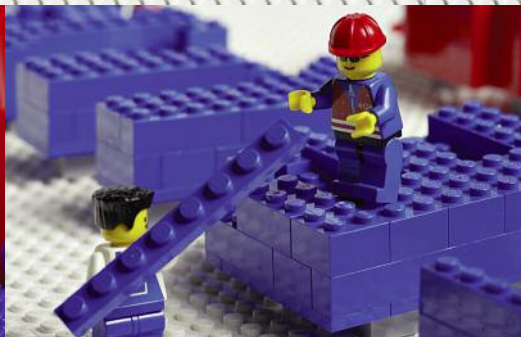
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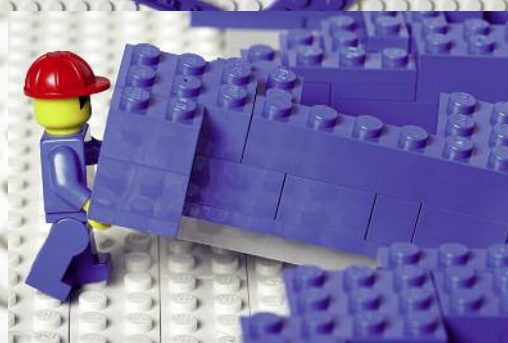
by Keith Oliver, Edouard Samakh,  
and Peter Heckmann

Lego art by Sean Kenney  
Photographs by Matthew Septimus





**How a supply chain transformation helped put the beloved toymaker back together again.**



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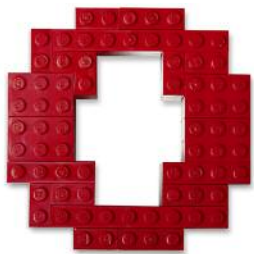
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**Editor's Note:**

The LEGO Group spells its trademarked brand name and its company name in uppercase letters. We have followed standard editorial style for company names that are not acronyms, and capitalized only the first letter.

Also contributing to this article was Booz Allen Hamilton Senior Associate Georgina Grenon.

**n the surface, the Lego**

Group didn't look as if it was in trouble. The fourth-largest toy-maker in the world at the time (today it is fifth-largest), the Lego Group sold €1 billion (US\$1.35 billion) worth of toys

in 2004, ranging from its snap-together bricks for young children to Mindstorms, a line of do-it-yourself robot kits for older kids. Even in the digital age, its toys maintained a surprisingly firm grip on the market and seemed to adapt well to changing tastes. The company's steady stream of new products routinely generated three-quarters of its yearly sales. Popular enthusiasm was so great that in 2000, the British Association of Toy Retailers joined *Fortune* magazine in naming the company's classic bricks "the toy of the century."

But the Lego Group's financial performance told another story. Despite its extraordinary hold on the imagination of children around the world, the Billund, Denmark, company was in trouble. The Lego Group had lost money four out of the seven years from 1998 through 2004. Sales dropped 30 percent in 2003 and 10 percent more in 2004, when profit margins stood at -30 percent. Lego Group executives estimated that the company was destroying €250,000 (\$337,000) in value every day.

How could such a seemingly successful toymaker lose that much money? Some observers speculated that the Lego Group had overdiversified its product line with moves into such areas as apparel and theme parks. Others blamed the exploding popularity of video games or pressure from low-cost producers in China.

Although there was some truth in these hypotheses,

many other factors impeded the success of the iconic global brand, including its innovation capabilities and its supply chain. The company leadership knew it had to address those problems, and that the supply chain posed the most immediate opportunity for improvement. The Lego Group's supply chain was at least 10 years out of date. Poor customer service and spotty availability of products were eroding the company's franchise in key markets. Speedy attention to the supply chain, the leaders reasoned, would not only buy them time to deal with the other challenges, but could help set in motion a virtuous circle of improvements that would support subsequent changes in the rest of the company.

And it would address head-on one of the company's most pressing challenges. Having established itself in an era when supply chain management was a matter of moving boxes from here to there, the Lego Group had missed a sea change as retail giants like Wal-Mart and Carrefour gained dominance. The company's supply chain was geared for custom delivery to the smaller retailers that had owned the toy market in the 1950s when its bricks first became popular. For nearly six decades, this way of doing business had served the company very well — and then the system started to fail. In the 1990s, as competitors focused on regearing for the big-box stores, the Lego Group considered its primary challenge to be brand building — despite the fact that its bricks were already among the most recognized toys in the world. By the end of that decade, most of the Lego Group had lost ground to companies that operated with much greater sophistication, companies that analyzed and optimized every cost driver to provide just-in-time service to the behemoths. (U.S. operations were a notable exception to this problem.)

To rebuild profitability, the company had to refashion every aspect of its supply chain. That meant eliminating inefficiencies, aligning its innovation capacity with the market, and re-gearing to compete in the new big-box world. This was no small matter for the Lego Group, which by the time CEO Jorgen Vig Knudstorp took the helm in 2004, had grown to roughly 7,300 employees, working mostly in two factories and three packaging centers — each in a different country — turning out more than 10,000 permutations of its products packaged in hundreds of configurations.

The company's leadership team recognized that even though transformation would be painful, it was imperative. "From my perspective, the supply chain is a company's circulation system," says Knudstorp. "You have to fix it to keep the blood flowing."

### Diagnosing the Problem

The symptoms of a dangerously misaligned supply chain can be deceptive. At the Lego Group, for instance, it took many years of underperformance before the company realized that the supply chain was a major source of its difficulties. What made those problems especially hard to identify was that they grew out of the company's core strengths: its capacity for innovation and its commitment to quality. Those were the very advantages that the company's leaders had relied on at first to reverse the profitless streak, hoping the company could innovate its way out of trouble. From the mid-1990s through 2004, the Lego Group moved into video games, TV programs, and retail stores. But the diversification added layers of complexity, and the red ink continued to flow.

In 2004, the family that had founded and run the

Lego Group knew they had to change direction. The then CEO Kjeld Kirk Kristiansen, grandson of the carpenter who had launched the company in 1932 and created the first snap-together Lego bricks in 1949, convened the leadership team to chart a new course. The measures they considered were radical, and to execute them, the Kristiansen family turned to an outsider. Kristiansen had been CEO for 25 years when he stepped aside in October 2004 for Knudstorp, then 34, a one-time management consultant who had joined the company in 2001 as a director of strategic development.

With the mandate for change clear, Knudstorp spent his first weeks as CEO working closely with Kristiansen and the other members of the board and the leadership team to pinpoint the source of the company's problems. Was the Lego Group too diversified? Yes, but focus alone was unlikely to be the silver bullet. Were costs an issue? Absolutely, but they were just one aspect of an array of challenges, including service, so a stand-alone cost play was unlikely to succeed. Had the company lost touch with the video game-obsessed consumer market? That hypothesis withered in the face of a simple fact: Three-quarters of the Lego Group's sales every year were from new, mostly nonelectronic products. "I believe that the focus on electronic competition was really a blame game," Knudstorp says.

Instead, as Knudstorp and his team examined every facet of the company's operations, they came to focus on the supply chain. They approached it holistically, analyzing every aspect of the company's product development, sourcing, manufacturing, and distribution.

**Product Development.** Given the success of the Lego Group's steady stream of innovative new offerings over the years, the "Kitchen," the company's product devel-

## The number of suppliers had gradually crept up to 11,000 — nearly twice as many as Boeing uses to build its airplanes.

opment lab, was a point of corporate pride. But the leadership team found that new products were delivering less and less profit. Each successive generation of offerings added more complexity. Plastic bricks and other elements that were once available only in primary colors, plus black and white, now came in more than 100 hues. A far cry from the simple box of bricks that baby boomers grew up with, Lego sets had grown much more elaborate: A pirate kit included eight pirates with 10 types of legs in different attire and positions.

Such intricacy and attention to detail reflected the firm's culture of craftsmanship, but also its disregard for the costs of innovation. The company designers were dreaming up new toys without factoring in the price of materials or the costs of production. That kind of care-free creativity is unsustainable in the current global toy market, where cost pressures are a constant concern.

Furthermore, introducing new products every year is not necessarily a bad thing, but the Lego Group did not align its supply chain with that business strategy. Just 30 products generated 80 percent of sales, while two-thirds of the company's 1,500-plus stock keeping units (SKUs) were items that it no longer manufactured. And the number of SKUs multiplied every year, increasing that backlog.

**Sourcing.** The Lego Group dealt with an astonishing array of suppliers, more than 11,000 in all. That's nearly twice as many suppliers as Boeing uses to build its airplanes. The numbers had crept up gradually over the years, as product developers sought new materials. Each engineer had his or her own favorite vendors, and the company's lack of procurement compliance procedures allowed the engineers to form ad hoc relationships with suppliers — a practice that grew more problematic as

the group expanded into new businesses.

These sourcing practices led to incredible waste. A new design might call for a unique material, such as a specially colored resin, that sold in three-ton lots. It might take just a few kilos of the substance to produce the new toy, but the company would be stuck with €10,000 (\$13,500) worth of resin it would never need. Ordering so many specialized products at irregular intervals from a large number of vendors left the Lego Group's procurement staff powerless to leverage the company's scale in dealing with suppliers.

**Manufacturing.** As was the case with sourcing, the Lego Group gained limited advantage from its scale in the way it organized its production facilities. The company ran one of the largest injection-molding operations in the world, with more than 800 machines, in its Danish factory, yet the production teams operated as hundreds of independent toy shops. The teams placed their orders haphazardly and changed them frequently, preventing operations from piecing together a reliable picture of demand needs, supply capabilities, and inventory levels. This murkiness led to overall capacity utilization of just 70 percent.

In such a fragmented system, long-term planning can be exceptionally difficult. Day-to-day operations were often chaotic. Operators routinely responded to last-minute demands, readily implementing costly changeovers. That the Lego Group's production sites were located in such high-cost countries as Denmark, Switzerland, and the United States put the company at a further disadvantage.

**Distribution.** The Lego Group paid as much attention to the thousands of stores that together generated only one-third of its revenue as it did the 200 larger

chains that accounted for the other two-thirds. Without clearly defined service policies, the company spent a disproportionate amount of time and effort serving small shops, which drove up the costs of fulfillment substantially. Sixty-seven percent of all orders consisted of less than a full carton — an incredibly costly proposition that demands labor-intensive “pick-packing” at the distribution center. In addition, to serve its many small customers, the Lego Group had developed a multiple-tier inventory system with local centers; it was very difficult to position the right product in the right distribution center, a challenge that contributed to missed sales and high inventory levels.

### Making Change Click

To drive the transformation, Knudstorp gathered a diverse group of senior executives and managers to take a two-track approach. The leadership team developed the strategy, while the larger group of planners and representatives from sales, logistics, IT, and manufacturing coordinated change at the operational level.

The leadership set up a war room where the operational team gathered every day to work out such nitty-gritty decisions as what toys to make, how tasks should be prioritized, and how to deal with obstacles. Team members tracked the progress of key initiatives, resolved bottlenecks as they arose, and settled a variety of issues. Assigning clear responsibility in this way avoided the all-too-human tendency in organizations to point fingers rather than solve problems.

The team drew up hundreds of lists tracking backlogged items, delivery glitches, and inventory levels, among other concerns, on white boards around the room, and at any given time over the next year, 30 to 40

people gathered to hash out plans. Knudstorp would often visit the war room, quizzing managers when he saw that an item had not been resolved since his last visit. “This is still here?” he would ask. The magnitude of the work was so daunting and the pressure to finish by year’s end so intense that at one point someone joked that everything would work out just fine, provided they move Christmas to the second week of January.



Despite the urgency, executives paid real attention to detail. They took care to set clear priorities, limit the scope of individual projects, and monitor progress closely. Each team worked out its cross-functional plans through lengthy workshops. The process started with an examination of one aspect of the company’s supply chain complexity and an analysis of its impact on productivity, planning, and control. These analytics were particularly useful in framing the case for transformation in the face of expected resistance. Using a hypothesis-driven approach, the team would debate how to change and improve processes. Once they’d agreed on a plan of attack, the teams would change direction only if the original hypothesis proved faulty — a tactic that team members say kept the whole process on track.

The leadership team also allotted time to consensus building. They knew that management by decree would never work well in a close-knit, family-owned company. The executives understood that, for the initiatives to stand any chance of success, the Lego Group needed to preserve the loyalty of its workforce, even as the move to a more global supply chain did away with many jobs.

The most respectful way to navigate through this transition, they reasoned, was to adopt a strategy of complete transparency. The team shared and debated the realities of the situation with the total workforce early in the process and consulted with them throughout in putting together the painful plans to address redundancy. (The Lego Group has also moved its U.S. plants to Mexico in search of labor cost savings and market proximity.) Yet as slow-footed as that process sometimes seemed at the time, working through it had an important benefit: When the teams finally reached a consensus, the decision stuck.

In tandem with the planning and consultative processes, the leadership ordered a pilot program designed to make sourcing more strategic. At its helm they placed Chief Financial Officer Jesper Ovesen — a clear signal that this initiative was of the utmost importance. Ovesen's team believed that rationalizing the cost of the company's materials would be one of the easier parts of the transformation and would yield savings immediately. Not coincidentally, the initiative went right to the heart of the Lego Group's innovation capability: the resins that gave the bricks their distinctive colors. If it succeeded, the pilot would do more than save money. It would demonstrate that the Lego Group really could change.

The price of colored resins, always a major expenditure for the company, was highly volatile. The sourcing team analyzed the prices of the raw materials and worked with a narrowed roster of suppliers to stabilize pricing. The resulting contracts made production much easier to plan. More importantly, the success of the sourcing project created a sense of optimism and the momentum to move ahead with other changes. At

each cost center along the supply chain, the transition team applied its new insight: Constraints don't destroy creativity or product excellence, and they can even enhance them.

Indeed, the idea of implementing new constraints could now help the company build on its established strengths. The Lego Group motto is "Only the best is good enough," and the company name derives from the Danish words *Leg godt*, meaning "play well." The drive to innovate was deeply embedded in the corporate culture. In the early years, this idea had helped the company develop its brand and instill pride in its employees. But after a time, it had come to be seen as a mandate to create new toys at any cost. In Knudstorp's view, the perceived mandate had evolved into a crutch. "This idea had become an emotional concept and an excuse to oppose new cost-saving initiatives," he says. "Anytime there was something someone didn't want to do, they would say, 'You cannot do that because of quality.'"



ut Mads Nipper, the company's chief of product innovation, worked closely with Bali Padda, who oversees the supply chain, to devise a series of day-to-day solutions to the paradox of constraints. Nipper and Padda recommended slicing the palette of roughly 100 colors in half. They also recommended cutting back on the thousands of different police officers, pirates, and other figures in production. The team took a deliberate approach, building on the resin-sourcing work to analyze the true costs of each element and identify those whose costs were out of line with the rest of the stock. This initiative, coupled with



## The drive to innovate, which was deeply embedded in Lego’s corporate culture, “had become an emotional concept and an excuse to oppose cost-saving initiatives.”

the resin pilot, helped the Lego Group cut its resin costs in half and shrink its supplier roster by 80 percent.

At the same time, the operational team put a process in place to help designers make more cost-effective choices. Team members devised basic rules regarding the creation of new colors and shapes and spelled out the requirements for ordering new materials. They also created a cost matrix, clearly showing the price associated with each change. Once the costs of innovation were clear, designers were urged to use existing elements in new ways, rather than devise new elements requiring new molds and colors. The initiative encouraged the designers to think in terms of price trade-offs when they were developing a new item: Yes, you can give sparkling amber eyes to your new Bionicle space alien action figure, but it may limit your choices on its claws.

Cost transparency gave developers a new way to define their achievement. “The best cooks are not the ones who have all the ingredients in front of them. They’re the ones who go into whatever kitchen and work with whatever they have,” wrote a senior manager in a memo to the Lego Group’s own Kitchen. The designers seemed to take those words to heart. The product development group “initially saw reducing complexity as pure pain,” says Knudstorp, “but gradually they realized that what they had seen at first as a new set of constraints could in fact enable them to become even more creative.”

The evolution of the design team’s thinking reaffirmed for Knudstorp an idea he has long held about the importance of looking at business issues holistically. “I think one of the big mistakes companies often make in this kind of initiative is approaching the supply chain as one topic, innovation as another, product quality as

a third. The better way to think about it is that all these issues are connected,” he says. “Innovation is also a supply chain issue, and sometimes the supply chain can provide ideas for consumer- or customer-driven innovation.”

### Approaching the Value Chain Holistically

Cutting the number of elements and colors in production made it easier to take the next step — rationalizing production cycles. The team started by halting the time-honored practice of making every machine available to produce any element, an approach that necessitated constant, costly retooling. Instead, the team assigned specific molds to specific machines, and set up regular four- to 12-week production cycles. The group then deemed that sales and operations would set orders at a regular monthly meeting, reducing the need for constant changeovers.

The leadership team also clarified decision rights to ensure that schedules made sense for the enterprise as a whole. For instance, it would no longer be acceptable to make manual changes in a molding machine without informing the finished-goods packing team, an important consideration since different kits are packaged in different boxes. Clearer descriptions of rights and responsibilities made it more difficult to dodge tough decisions, or to make them without considering their impact on other departments. As a result, the company was able to sidestep many potential production glitches.

The team also considered the manufacturing footprint. The Lego Group had already outsourced 10 percent of its production to Chinese contract manufacturers, but the team decided against sending more work to Asia. Instead, building on its successful experience

## Getting the right product to the right place at the right time at the right cost was an important early step in grappling with an array of strategic challenges.

moving some production to Kladno, Czech Republic, the company concluded that it could actually boost efficiency by locating its factories near its most important markets. A plant in Eastern Europe would get products to European store shelves in three to four days — an important consideration given that Europe accounts for 60 percent of the company's sales and that 40 percent of sales take place during the Christmas season.

In 2005, the Lego Group began outsourcing the manufacture of its simpler products to a Hungarian facility belonging to Flextronics, a Singapore-based electronics manufacturer. That year the company also expanded its operations in Kladno. Arriving at this point, however, was difficult in two ways: The negotiations were long and difficult, and the impact on the company's workforce had to be managed with great care. Chief Purchasing Officer Niels Duedahl was tasked with overseeing the process, supported by a team of analysts who built detailed cost models. Their philosophy was to understand their suppliers' costs better than the suppliers themselves did. This approach would enable the Lego Group's leaders not just to evaluate the options but also to approach subcontractor proposals armed for negotiation.

The Lego Group also needed to move its distribution channels closer to the customer — and to lower its bloated distribution costs. First, the number of its logistics providers was cut from 26 to three or four — enough to ensure resilience and gain greater economies of scale while still encouraging competition among the suppliers. This step alone saved more than 10 percent in transportation costs. But consolidating logistics providers really just brought the Lego Group in line with what many of its competitors had done years ago.

However, the company was able to leapfrog the competition by redesigning its entire distribution system.

Although many companies have taken manufacturing to lower-cost markets and to contract providers, surprisingly few have done the same with distribution, although identical advantages exist. The Lego Group phased out five centers in Denmark, Germany, and France and created a single new center in the Czech Republic, to be operated by DHL. “Putting all your eggs in one basket” might sound like a poor strategy to reduce risk, but consolidated distribution made inventory easier to track and made stock shortages far less likely. It also brought the Lego Group closer to Europe's largest population centers, decreasing the average distance to market.

With a new value chain in place, the Lego Group could act with the understanding that customers had differentiated needs. The company's marketing team followed the examples of other consumer packaged-goods manufacturers, working more closely with the largest retailers to conduct joint forecasting, inventory management, and product customization. Those big-box and chain stores that made up the bulk of the Lego Group's market would receive marketing support as well. The company would continue to deal with smaller sellers, but on more regular and standardized terms. The company further minimized the cost of serving each account by providing discounts for early orders and refusing to ship less-than-full cartons.

The largest Lego Group customers were also invited to participate in product development. Not only would this presumably make the big clients happier, but the retailers' strong forecasting and replenishment technology would give the company marketers access to a

greater level of insight into buyer behavior than the company had on its own. The Lego Group would also let these large retailers help make assortment decisions, and sweeten the relationship further by providing some SKUs on an exclusive basis.

### Profitable Once More

Thanks in part to its supply chain transformation, the Lego Group is profitable once more. It has saved approximately €50 million (\$67 million) since 2004, and forecasts savings in excess of €100 million (\$135 million) over the next two years. The tremendous gains in efficiency meant that despite the impact of rising oil prices on materials and transportation, stock turnover increased by 12 percent in 2005, and the same year, the Lego Group recorded its first profits — €61 million (\$72 million) — since 2002. This positive trend further continued in 2006, with the Lego Group turnover up by 11 percent over 2005, and profits up by a staggering 240 percent. The Lego Group supply chain is now so advanced that the company is actually “slightly getting ahead of the competition in some parameters,” says Knudstorp.

The gains are more than operational. Knudstorp argues that the supply chain restructuring has had a transformational impact on the company as a whole. Getting the right product to the right place at the right time at the right cost was an important early step in grappling with an array of strategic challenges. “It has allowed us to again focus on developing the business, on innovation, and on developing our organization to become a much more creative place to work,” says Knudstorp. “Those are luxuries we didn’t have when we didn’t make money and we had a supply chain that was

10 to 15 years behind the times.” Now that the Lego Group has rationalized and streamlined its product development, sourcing, manufacturing, and distribution, it can pour its resources into what it does best: making wonderful toys. +

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