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INNOVATION AT THE LEGO GROUP (B)

Professor David Robertson and Research Associate Rob Crawford prepared this case as a basis for class discussion rather than to illustrate either effective or ineffective handling of a business situation.

FEBRUARY 20, 2008. The 2007 results were in. While there remained much more to accomplish, Jørgan Vig Knudstorp felt that the LEGO Group's recovery was going well. By restructuring the company, redefining the innovation process, connecting with outside development partners, and putting in place a number of mechanisms to coordinate innovation efforts, the company had reversed its slide (*refer to **Exhibit 1** for selected results*). Sales were up overall, and efforts to revitalize brands such as LEGO City and Bionicle had succeeded. The relaunch of LEGO Mindstorms – codeveloped with a passionate group of outside enthusiasts – had been more successful than expected, selling more than 150,000 units in 2007. The company had introduced some toys based on LEGO Factory designs and the service was growing rapidly. And the company had some good ideas in the pipeline that could lead to further growth, including an online multiplayer game to be called LEGO Universe.

One of the first steps in the turnaround had been to restructure the company to give each part of the business clear responsibility for achieving its profitability targets. Until mid-2005, the LEGO Group's innovation efforts had been broken down according to age groups, but the activities of each designer had not been connected to any individual statement of profit or loss. Knudstorp and his team recognized that they needed to establish profitability as a core goal, so they reorganized the designers into product groups, each of which would have sales and profit targets[1]. "We had to align structure with value creation," said Knudstorp. In addition, he decided to publicize the results, comparing the performance of the various product groups:

> We began to put the sales figures on the web. And every week, we sent out a newsletter to explain what it meant and what we wanted to do.

One of the changes in structure was the separation of the Concept Lab, which had been integrated into the main product development organization. As part of the restructuring, the company separated the development of revolutionary play experiences and assigned them to the Concept Lab. They challenged the Lab to develop new experiences that were "obviously LEGO, but never seen before." The Concept Lab was also restructured geographically – innovation hubs were located in some of the company's most important markets, including Japan, Germany, the US and Spain. LEGO employees in the markets developed a network of local inventors who were charged with developing new play concepts for the LEGO Group.

The LEGO Innovation Matrix

But this was only the first step. Knudstorp knew the company needed to coordinate the different types of innovation more effectively. For example, the LEGO Factory service required the creation of a new development environment (LEGO Digital Designer) and the implementation of a warehousing system that could assemble and ship custom kits – both significant innovations in their own right. To improve coordination, the team defined eight innovation types, organized into four categories (*refer to **Exhibit 2***). And, realizing that different levels of innovation should be managed by different groups, they separated the responsibility for developing revolutionary new products from that for incremental improvements, such as the next generation of Bionicle or LEGO Star Wars toys (*refer to **Exhibit 3** for LEGO's three levels of innovation*). By combining these two dimensions, they created a matrix that charted the different

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[1] Product Group 1 had responsibility for LEGO City, LEGO Creator, Mindstorms, and Duplo product lines – products that were, with the exception of Mindstorms, oriented toward younger children. Product Group 2 had responsibility for Exoforce, Aqua Raiders, LEGO Castle, and the branded offerings such as LEGO Star Wars™, Harry Potter™, Spiderman™, Batman™, and other licensed offerings. Product Group 3 was responsible for Bionicles, LEGO Racers, and Technic toys. A separate group called Community, Education and Direct to Consumer had responsibility for virtual toys, including LEGO Factory.

levels and types of innovation (*refer to **Exhibit 4** for the LEGO Group's innovation matrix*). The matrix became a key tool in the redesigned LEGO Development Process.

The LEGO Development Process

In addition to new product ideas, the Concept Lab was also charged with improving how LEGO should innovate, including the LEGO Development Process (LDP). The poor success rate of development projects had become a source of frustration to LEGO employees. According to Per Hjuler, vice president of product and marketing development,[2] "most ideas seemed to go nowhere, and designers were unhappy about it." Improving the success rate, he reasoned, would boost morale, as well as saving a at deal of energy and time.

Hjuler and his team began to transform the LDP. Conceived in 1995, the LDP had evolved into an excessively bureaucratic process. According to Hjuler:

> At first it worked well, but then it got too dense. Each step of the way, people had to fill out multiple forms and checklists, which they understood in their own ways. To simplify the process, the check list was eliminated and virtually all authority delegated to product teams. We focused on gates and deliverables; the rest was left to the teams to sort out on their own.

The new LEGO Development Process had four major gates:

- P0: Scheduled for February of each year, this gate was a two-day workshop in which the major trends and inspirations from the market would be combined with ideas from inside and outside the company to determine the direction and emphasis for two years out (e.g., the February 2008 workshop focused on the toys to be delivered in 2010).

- P1: Scheduled for June of every year; team members from some of the toy lines[3] presented briefs that outlined general trends, themes, and toy concepts for their area. The result was the selection of concepts to develop further.

- P2: Scheduled for September; the product teams estimated sales figures and a rough business plan, and presented prototypes; the goal was to approve concepts for further development.

- P3: Scheduled for December; the product teams established the projects on which they would deliver – i.e., manufacture for distribution – during the next year. At this gate, they chose their final design and business strategy, as

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[2] Hjuler's responsibilities in the new structure included the management of Product Group 2, oversight of the Concept Lab, and the continuing improvement of the LEGO Development Process.

[3] If a clearly defined toy line such as LEGO City or Bionicles was only developing "Adjusted" (e.g., incrementally improved) products, then they wouldpresent their concepts until P3.

well as allocating resources to make it happen. (For a typical product line, this step would result in 10 to 20 different toy projects.)

To prepare for each gate the team went through three phases:

- *Exploring* emphasized the need for outside input to ensure that customer and partner feedback was collected and incorporated into the design.

- *Developing* required the development of prototypes for testing. As the process moved from P0 to P3 these prototypes became more realistic, starting from rough sketches and moving to realistic models. In the later stages of the process the models would include packaging designs as well.

- *Validating* required the team to test the prototypes. [*Refer to **Exhibit 5** for a description of the LEGO Development Process.*]

The results were impressive. The revamped process, coupled with the separation of revolutionary new play experiences (now assigned to the Concept Lab), shortened the development time for new product variants from 36 months to 12. And, Hjuler saw, the new process also greatly boosted the percentage of ideas that made it to market and the satisfaction of designers:

> Before, if a designer worked on ten ideas, only one or two made it to market, because we were experimenting a lot, exploring new things. That's not possible any more, because the designers have a stricter brief to work on. But to balance that, their hit rate is much higher. Of ten ideas, about nine will make it into market now. And the designers are very happy about that.

Not only did a higher percentage of projects result in new toys on the market, but the toys on the market were also more successful. For the LEGO City line of toys, which the company had considered dropping, sales increased dramatically. From revenues of DKK 350 million in 2005, they doubled the next year, and reached DKK 1.5 billion in 2007. The LEGO City team, which had been concerned about losing sales because of the reduction in the LEGO elements available, found that by clarifying the brand, following a disciplined process, and focusing more resources on marketing, they were able to achieve the increased sales with fewer models.

The new process also used the Innovation Matrix (*refer to **Exhibit 4***) to ensure that the different types of innovation were coordinated and appropriately staffed during development. The new process required each team to chart on the innovation matrix the level of innovation needed for each type of innovation. For example, for the development of the next generation of LEGO Mindstorms, the robotics development kit, the company decided to leverage the talents of outside enthusiasts. Mapping the overall development task on the Innovation Matrix showed the Mindstorms development team that, while the product would represent a major new configuration, the greater challenge for the company was going to be the changes in the way it communicated with its lead customers, and the processes it used to develop the product. (*Refer to **Exhibit 6** for the Mindstorms innovation map, and see pages 6–8 below for more on the Mindstorms development effort.*)

Reducing Complexity

Adding to the challenge for designers during the changes to structure and process, the company decided to stop production of over half of the 12,500 components in production. This was a controversial decision for the designers – some argued that it would cut the range of toys possible and hurt sales. But the controversy was short-lived, Hjuler said:

> The designers turned around really quickly. They realized they could be more creative based on a smaller number of elements because the remaining elements could be applied in many different ways. In a way, they rediscovered what LEGO was all about.

Or, as Knudstorp put it: "Innovation flourishes when the space available for it is limited. Less is more."

One thing the company was not prepared for was the reaction from outside the company. Many passionate LEGO customers were disappointed when their favorite components were discontinued. For example, when the company decided to cut the number of faces for LEGO's chef figurine from seven to one, the strong response, both from internal designers and from external enthusiasts and collectors surprised them. In response, the company held a small ceremony for the "dead" chefs and some of the other discontinued elements and created a memorial site for them (*refer to **Exhibit 7** for pictures of some of the "dead" LEGO chefs*).

Opening Up

Knudstorp and his team knew that they had to re-orient the company to seek and accept input from the outside as an integral part of their product development and marketing processes. This represented a fundamental shift in the company's culture, which had been more inwardly focused. Many feared that opening up the company would slow down development and could result in ideas for new toys leaking out, allowing competitors to copy the ideas.

Hjuler and his team experimented with a number of ways to directly approach customers for input, including:

- Customer research in LEGOLANDs and LEGO retail stores.
- The creation of focus groups.
- Surveys of education professionals who use LEGO products.
- Structured play events, in which children were invited to play with new product concepts while LEGO developers watched.
- Confidential product testers – families that signed confidentiality agreements, received toy concepts to play with, and provided feedback to the LEGO Group.

- A more systematic use of "LEGO fan events" as places to go to find new ideas and test internally generated concepts.

The Brick Event

One such fan event which represented a valuable source of ideas and feedback was the LEGO Brick Event (today called LEGO World). In 2000, Roy Cordes – a marketing specialist in LEGO Holland – wanted to create an event to display the company's latest products in a forum for both children and adults, where visitors could play and experiment together. "I wanted them to see the products, but also to share the emotion," he explained. Cordes first contacted the local LEGO fan clubs for volunteers and enthusiasts. Then, he rented warehouse space for the event, where he amassed unsold brick sets as well as new promotional kits and materials coming available. The result was a huge event, the success of which was so great that it became an annual event with more than 10,000 visitors per day over 6 days.

Designed as a show case, Cordes quickly realized that information was also flowing *into* LEGO. "We quickly saw that we could get good information about consumer preferences," he said, "which helped us to market the products better." Members of the LEGO product groups began to show up. They interviewed customers to seek their impressions of new products, but also to learn what they wanted for the future, i.e. the vision they had of what the company could do. In addition, the product groups observed how participants played with their latest kits, to discover what worked and what didn't. It was a new kind of consumer research for the company, a laboratory that provided direct interaction in a setting outside of LEGO headquarters that allowed designers to test prototypes and their most advanced ideas on consumers. Even LEGO suppliers were testing prototype devices at the 2007 event. For example, Hermann Hainzimaier, the founder of CODATEX, tested a new kind of Mindstorms sensor at the event, in cooperation with the Mindstorms team.

Linking with Outside Innovation: Design DNA and Style Guides

Another change lay in making greater use of the skills of outside inventors. The company developed a network of inventors, coordinated by Concept Lab personnel but charged with developing both incremental and revolutionary ideas for new products. To use these inventors effectively as well as to guide their internal efforts, the company needed to communicate to them the characteristics of each toy line. To do so, it developed the concept of the "Design DNA." Each toy line had a specific DNA, which specified the target audience, the play experience desired, the "expression" of the toy (how realistic vs. fictional, light vs. dark, timeless vs. trendy), and other details. (*Refer to **Exhibit 8** for Exoforce Design DNA and to **Exhibit 9** for examples of Exoforce toys.*)

The company also needed to develop a means for coordinating with companies that made complementary merchandise such as books, T-shirts, games, movies and other products. One toy line that used these outside companies extensively was Bionicle. From its invention in 2001, Bionicle was a character-based game set

in a fast-moving narrative. Every year, as the story line changed, so did LEGO's product offerings: One year it might occur in space, while the next year the narrative would take place under water. The team found that coordinating the development of new toys with the development of complementary merchandise was difficult and often chaotic. "We were unstructured and that cost us time," recalled Birthe Jensen, marketing director, which translated into lost opportunities:

> It was so fast-moving that we had to put everything out at the same time. Everything had to look like it came from the same place, even when suppliers were producing T-shirts and books on their own.

While Jensen and her team were searching for a way to achieve that kind of multimedia consistency on a limited budget, she was struck by the potential of the LEGO Development Process. "We needed some kind of governance or coordination mechanism," she explained. Then she realized that the LDP could incorporate a "guide," in which all information was gathered for dissemination in an orderly way. To do so, she noted:

> We had to foresee what would be hot in the story and then brainstorm…to come up with the right models and graphics for the style guide, right down to the lettering.

While the internet enabled her group to communicate instantly with Bionicle's partners and suppliers, of which there were nearly 50, Jensen recognized that her group had to get their buy-in at least one year in advance. This meant developing a consensus during the LDP, in effect allowing their collaborators to contribute to the style guide via suggestions and critiques. "That wasn't an easy task," she admitted, "because everyone wanted to control their portions." (*Refer to **Exhibit 10** for selected images from the Bionicle Style Guide.*)

The result was a substantial expansion of licensing revenues. With the partners, each of whom paid 10% to 14% of their sales revenue to LEGO for use of the Bionicle brand, Jensen explained, "We created a new business model for LEGO, based on licensing. It has become one of the biggest sources of revenue to the company."

Leveraging the Enthusiasts: The Development of Mindstorms NXT

LEGO's first Mindstorms robot kit was released in 1998. By 2001, LEGO had sold nearly a million of these kits and created a devoted group of (mostly) adult fans and launched the company into sophisticated electronics products. The fans remained extremely active and enthusiastic on a number of internet sites: They wrote dozens of books, hacked into the Mindstorms software system, developed new hardware accessories, and even invented new programming languages, some of which were considered better than LEGO's. "They came up with ideas that LEGO designers had not even dreamed of – we couldn't keep up with them," observed LEGO employee Steve Canvin.

As the company began to transform itself in 2004, Tine Vangbo was appointed design manager of Mindstorms NXT, the next generation of the robotics building

kit. She was determined to create a new kind of LEGO product. She explained, "We wanted to do for robotics what the iPod did for music – make it easier for kids to use." In the atmosphere of experimentation, they decided to try a new method of product development that would harness the energy of the fan community. According to Canvin, who became the business manager of Mindstorms NXT:

> We wanted to engage the [Mindstorms] lead users in the development phase as co-creators, prototype testers, and perhaps even its marketers. That would tap into their enthusiasm and talents. It would also create buzz.

In 2004, during the earliest development phase, Vangbo's team found four "hard core adult fans" in one of the online communities. Canvin recalled:

> We did a covert search to find real leaders, and we found them among the hackers that played with the first Mindstorms kit. It was a hobby to them.

Dubbed the "fab four," they immediately agreed to sign a non-disclosure agreement with LEGO. Vangbo's team then began sharing the toy concept and sending them prototypes for feedback. She explained:

> This was legally sensitive, because the price information was secret and they were hackers – we had no idea what they might do. Fortunately, none of our fears [of intellectual property or trade secret losses] were realized.

After playing with the prototype systems, the fab four offered many useful suggestions, including the creation of entirely new components. In late 2005 the group was expanded to 11, who were sent a "Christmas present" to test – a more finished "beta kit." According to Canvin:

> We wanted them to try out the hardware and software, identify problems, propose solutions for the bugs they found, and offer additional suggestions.

The product was announced at the Consumer Electronics Show (CES) in January 2006. The set had over 500 pieces, including four sensors (for light, motion, distance and touch), three motors and the NXT programmable brick (*refer to **Exhibit 11***). It came with a powerful programming language that had a simple visual interface[4]. At the CES they expanded the development team to continue the testing and refinement of the kit and to create models that customers could build. Canvin recalled:

> We asked for 100 volunteers, expecting only about 1,000 to come forward. Instead, almost 10,000 applied, and they had to pay us to join!

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[4] The programming language, while not open source, allowed users to create new functional modules and post them for others to use. For example, the creator of a new RFID or magnetic compass sensor could easily create and distribute the new programming block needed to control the sensor.

This allowed the group to enlist a much more diverse group: The new volunteers were divided according to interests, including academics, writers, programmers, website designers, builders, and the like. "They were going to be our evangelists," Canvin said, "and though they signed an NDA, we planned to allow them to speak freely once it was on sale." As anticipated, after offering valuable suggestions and observations, these volunteers transmitted their enthusiasm to the Mindstorms community.

Launched for sale in August 2006, Mindstorms NXT sold 150,000 units during the first year, well beyond expectations. According to Canvin:

> It was the first LEGO product to use the [customer] community to develop and create buzz. Now, other LEGO projects are attempting to do the same thing, from their early development phases[5].

In addition to fan sales, Mindstorms NXT became an important vehicle for the LEGO Education Group, whose mandate was "to make a difference in education with unique building experiences, but also in other dimensions, such as team work," according to its creative director, Hanne Bonnstein. The group, founded in 1980, had been seeking new ways to create markets. The Mindstorms NXT, they recognized, was the ideal medium for a team competition, in which students would cooperate to design a robot to complete some challenge. All the school needed, Bonnstein explained, was "a Mindstorms NXT kit. We then sent them materials on what they needed in the classroom, software for the teachers to use, and parts" when needed. The contests culminated in an international competition.

LEGO Factory

In 1999 LEGO employee Mark Hansen created an interactive computer film of a LEGO world that could operate online. With the support of his boss, Tormod Askildsen, his idea was to extend the LEGO experience into the online world. Hansen was convinced that he could create a personalized – or "mass customized" – virtual three-dimensional building environment, where construction could take place without physical bricks, yet nonetheless accurately duplicate the real-world experience. Their first experiment in customization was a product called "Mosaic," a two-dimensional image composed of colored bricks. "All you needed," Askildsen explained, "was a digital photograph, and we would create an image from it." Hansen began to nurture a vision that LEGO users might enjoy a computer-based system to experiment with, to produce and even market their own designs.

Though the intervening crisis almost killed Hansen's idea, he kept pushing it with top LEGO managers. The idea had grown into a system that would enable LEGO designers and engineers as well as fans to have a building tool that all of them

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[5] Canvin's initial role, as user community coordinator, was created in response to an email from one of the initial user panel members, Steve Hassenplug. Hassenplug emailed the Mindstorms development team, suggesting that if the 100 new user panel members were not listened to and managed well, they could become a source of very negative press.

could use, together if they wished. With the advent of the new leadership in 2004, he obtained $1 million to hire an outside firm to develop an e-commerce platform that allowed customers to design and then order the parts for their creations. In 2006, the new system – called LEGO Factory – was ready. Because the pieces had to be assembled, Hansen noted:

> It was more expensive than the normal kit, but it was completely customized. They could even design the box they wanted it to arrive in.

But Askildsen and Hansen wanted to do more than that. "We realized that we had extraordinarily talented users," Askildsen explained, "and we thought there must be some way to use their talents as well as create a community event." To channel their ideas, Askildsen decided that they should announce contest themes, the first two being trains and houses:

> The contest helps to develop momentum. We told fans what bricks they had and asked them to create the most interesting designs they could with them. We got thousands of submissions for both categories and chose the best ones to sell.

The first customer-designed kits became available in the summer of 2007, in a pilot project to test profitability; the winners were named on every package. Askildsen concluded:

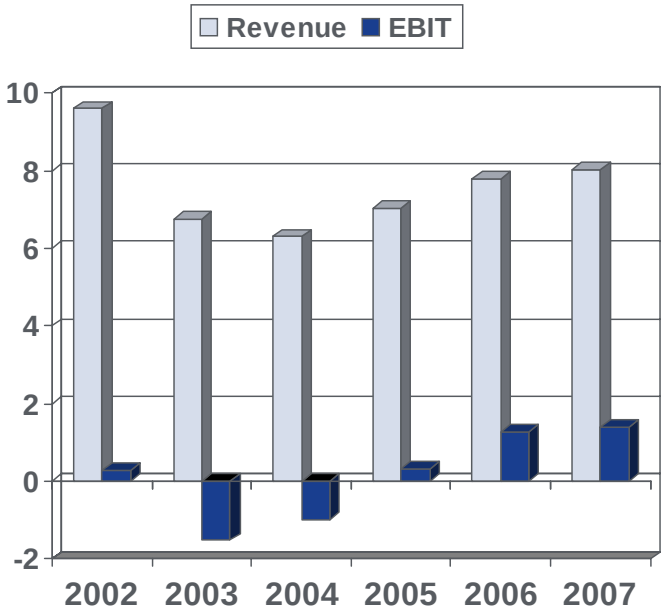
> If we can make money, we plan to set up a design workshop for fans, who will vote on what is best. We will also create a way for fans to share in the profits of the designs that sell well, to give them an incentive. [*Refer to **Exhibit 12** for images of the two toys.*]

LEGO Universe

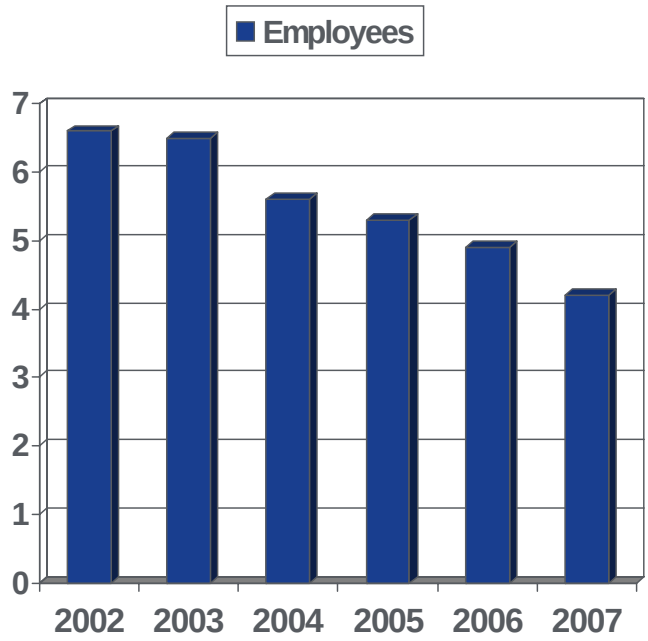
Building on the Factory concept, Hansen and his colleagues began to create an online multiplayer gaming environment, the LEGO Universe, which they envisioned to be an entire virtual environment that customers could enter. Once inside, customers would be able to build entire worlds – pirate ships, space stations, cities – with anonymous players or restricted to a list of friends. "It will be a place to create custom content," Hansen explained, "which they can then order from the LEGO factory." Every LEGO product group, he said, was cooperating to put its latest products into the Universe, where they would be interconnected. LEGO Universe would also give LEGO employees the opportunity to observe how customers use and behave with featured products, as well as to introduce and market new ideas. Knudstorp was so impressed that he designated LEGO Universe as one of the 3 potential growth areas for release in 2009, an entirely new departure, but one that was still tied to the LEGO brick. (*Refer to **Exhibit 13** for pre-release images from LEGO Universe.*)

Exhibit 1
LEGO Group Statistics

Revenue and Earnings before Tax (DKK billions)



Employees (thousands)



Source: Company information

Exhibit 2
The LEGO Group's Eight Types of Innovation

Source: Company information

Exhibit 3
The Three Levels of Innovation

Redefined Innovation

In redefined innovation we strive to introduce **never seen before** propositions. We do this through a broad understanding and analysis of long term social, cultural and industry trends, creating strategic directions for the future. We do this with an entrepreneurial mindset, ensuring our propositions become obviously recognized as LEGO.

Reconfigured Innovation

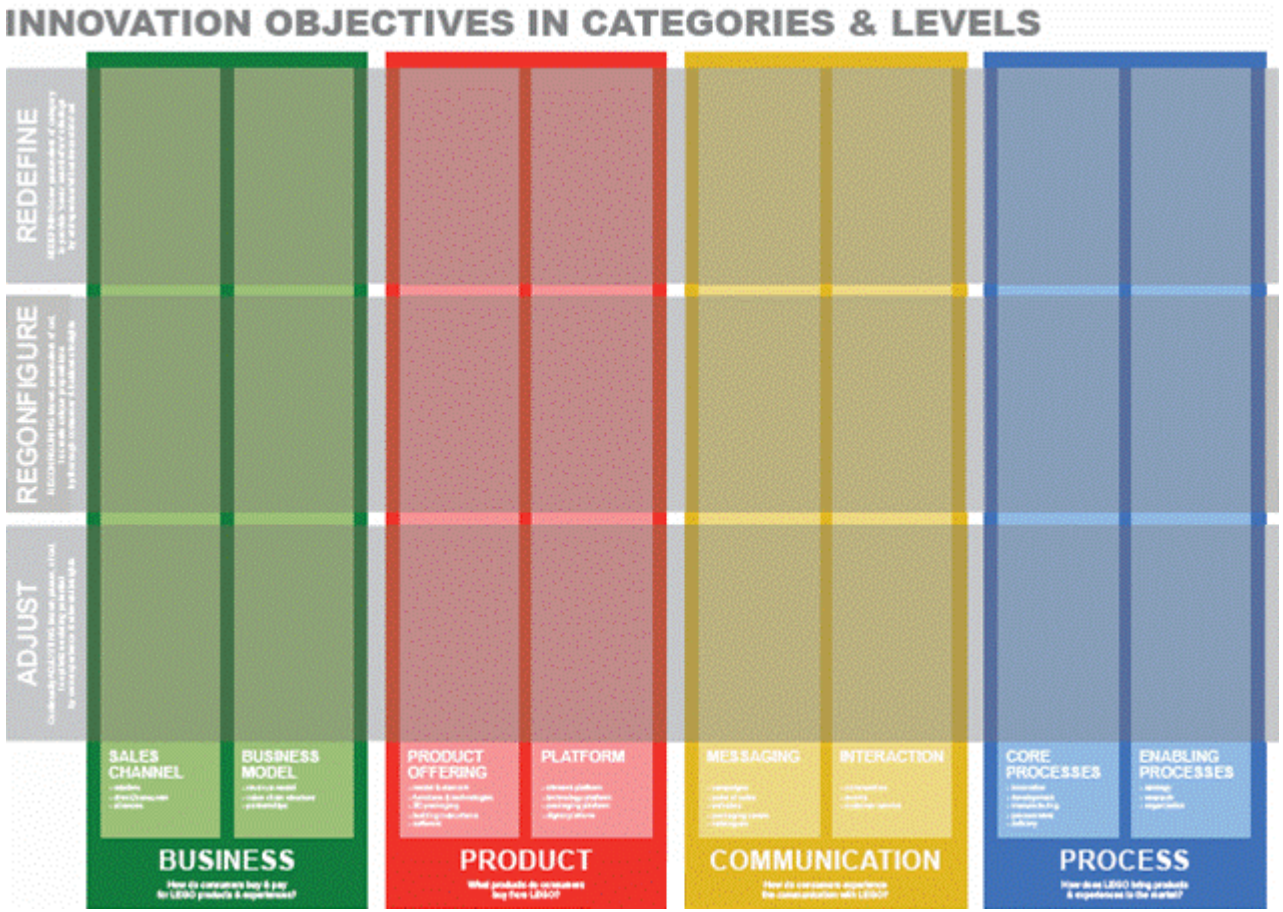
In reconfigured innovation we **combine known parameters** of category to create unique and better solutions to know propositions. We do this based on thorough insight to consumer needs, industry trends and market forces.

Adjusted Innovation

In adjusted innovation we focus on **continually adjusting** all known parameter of the categories, to optimize existing solutions. We do this through analyzing the cause and effect of adjusting identified parameters. Findings are based on own experiences and relevant insights. We do this always striving to be better.

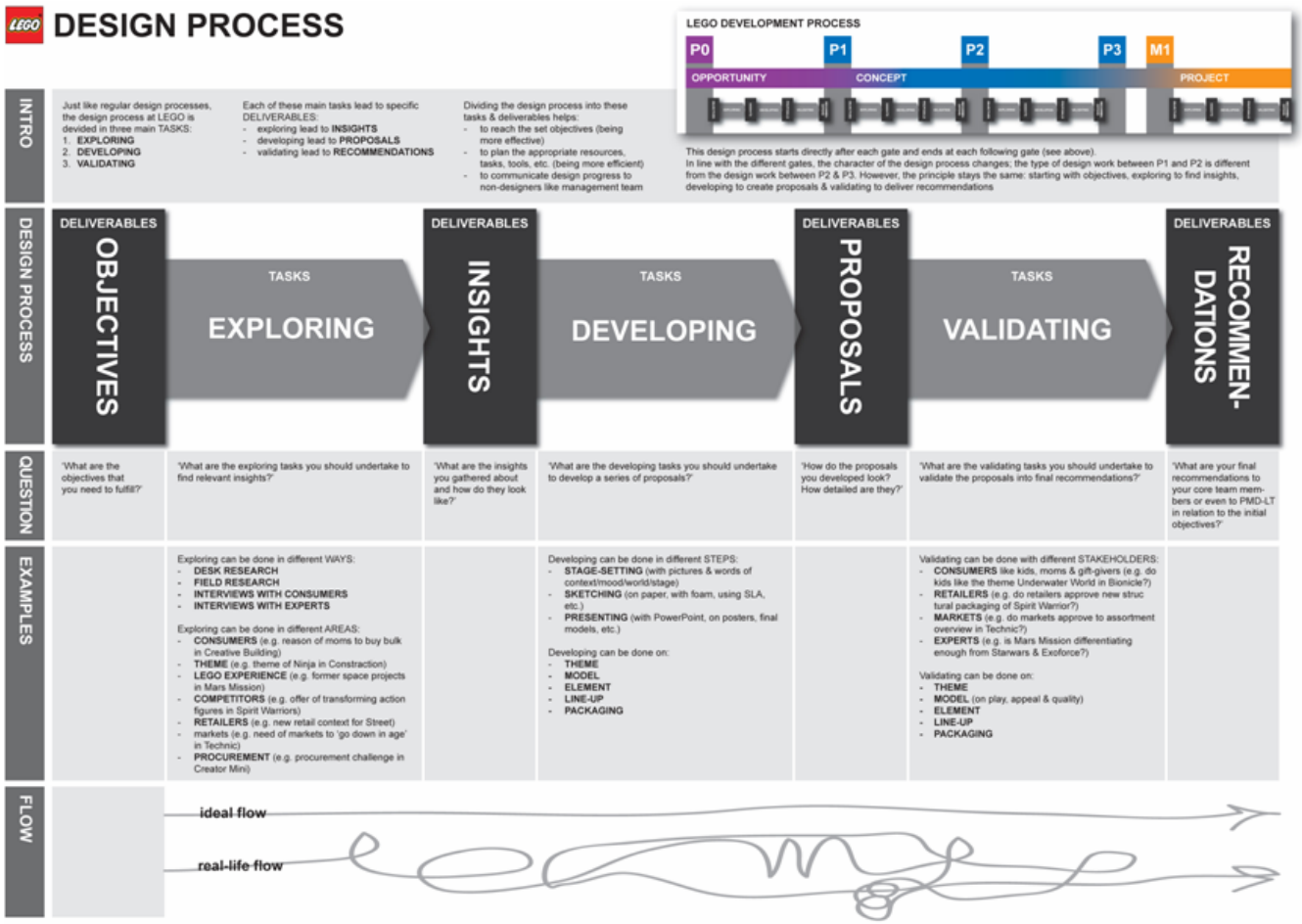
Source: Company information

Exhibit 4
The LEGO Group's Innovation Matrix



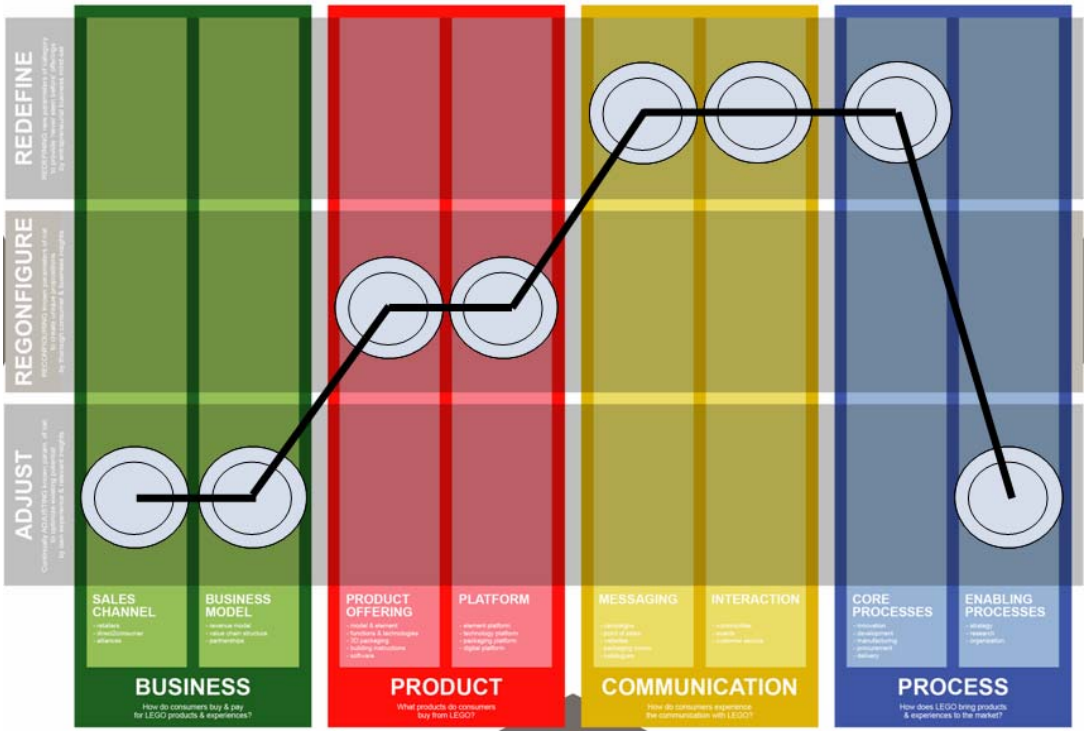
Source: Company information

Exhibit 5
The LEGO Development Process



Source: Company information

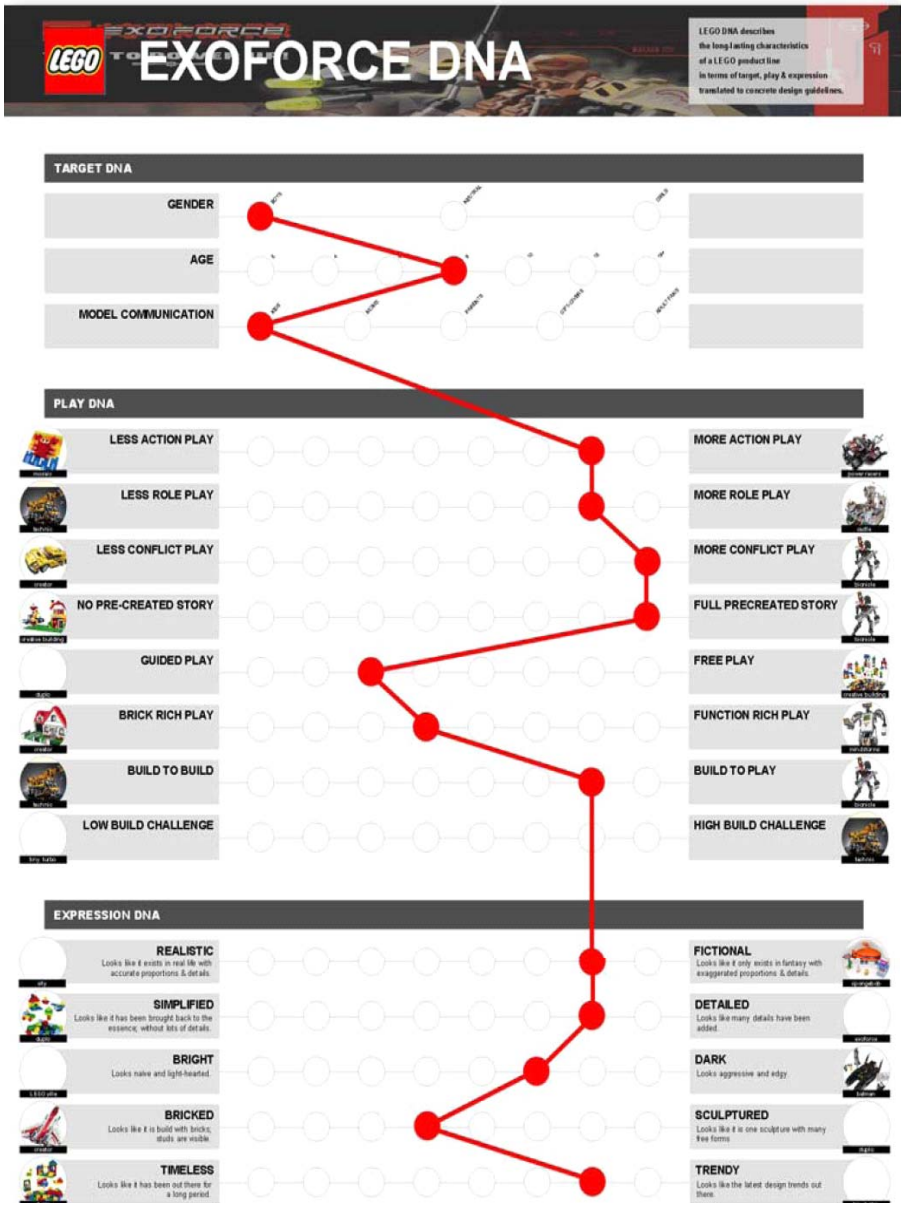
Exhibit 6
The LEGO Mindstorms Innovation Map



Source: Company information

Exhibit 7
The LEGO Group's Chef Figurines

Exhibit 8
Exoforce Design DNA



Source: Company information

Exhibit 9
Exoforce Product Samples

Source: Company information

Exhibit 10
The LEGO Bionicle Style Guide Cover and Table of Contents

Exhibit 10 (continued)
The LEGO Bionicle Style Guide – Selected Images

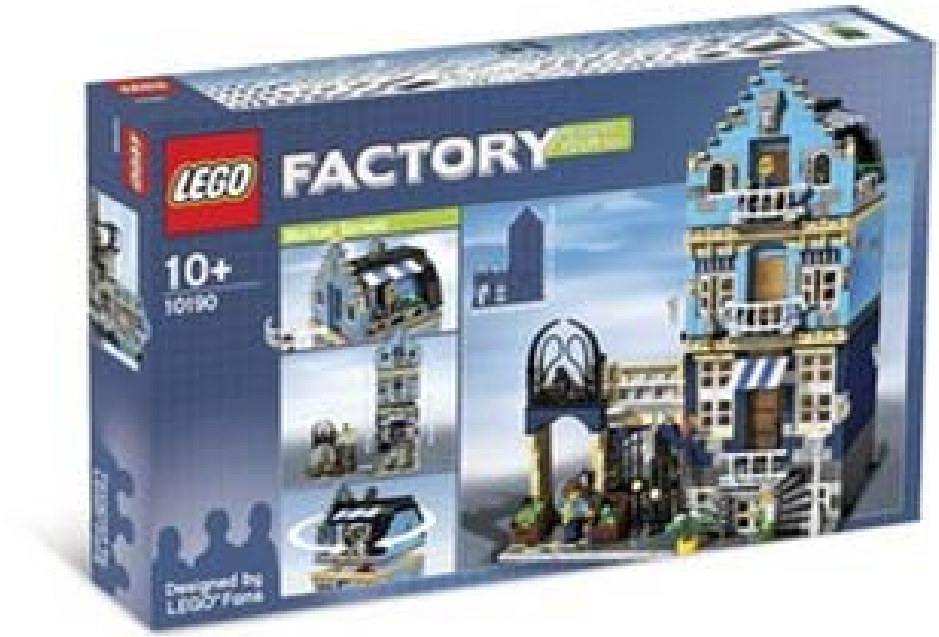
Exhibit 10 (continued)
LEGO Bionicle – Selected Product Concepts

Source: Company information

Exhibit 11
Mindstorms NXT Model

Source: Company information

Exhibit 12
LEGO Factory Train and House Toys



Source: Company information

Exhibit 13
Pre-release Images from LEGO Universe

Source: Company information