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Documentation

The Power of Innovation

Presentation by Martin Riediker, Chief Technology Officer Ciba Specialty Chemicals at the Annual General Meeting, 2003

Dear shareholders,

Science and research constitute the foundation of our company. Innovation is a crucial element of our corporate culture and is essential to sustainable growth.

You've just seen two examples in our video of how we translate research and development into successful innovative products on the market. I'd now like to go into more detail about the role of technical innovation as a factor for success at Ciba Specialty Chemicals.

The first thing I want to do is outline the pillars on which our company's innovative strength rests. Then I will deal with some examples of successful innovation. Thirdly, I will lift the veil on some key technologies of the future.

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What is the foundation on which Ciba' innovative strength rests, and how can we make the most of that strength?

The first pillar is having a strong technological foundation. Ciba Specialty Chemicals can build here on a rich heritage of expertise. We now have an extensive technological portfolio. Solid state chemistry and physics are part of our core competencies. Likewise, so are catalysis and biocatalysis, polymer chemistry, photochemistry and organic synthesis.

Effects are our business. We modify and formulate molecules in such a way that they produce a desired effect. Protection against wrinkling for your shirt, striking color effects for your car and countless other effects. To achieve this, we make maximum use of our technology platforms across all segments.

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The second pillar is our in-house and external network of highly qualified research scientists. In 2002 we invested a total of 294 million Swiss francs in research and development. This comes to 4.2 percent of our total sales. About 1,500 employees at 22 research sites worldwide are involved in research and development at Ciba. Our chemists work hand in hand with physicists, materials scientists and application engineers.

External scientific contacts are no less important than the internal exchange of information. Through active monitoring, we ensure that our finger is on the pulse of state-of-the-art science. We invest about one tenth of our research spending on cooperative efforts with universities, research institutes and industrial partners. We gain access to new knowledge and new technologies by working together with 76 leading universities and institutes in 14 countries worldwide.

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The third pillar is the targeted and result-driven exploitation of our technology portfolio and our resources through active research management. Our technology strategy is developed and implemented by the Research & Technology Board. Its tasks include the optimization of structures and processes and the review of research and development performance on the basis of clearly defined performance indicators such as sales achieved with new products or patent activities.

We want to speed up the innovation process, direct it better and exploit the synergies even faster. To do so, we have instituted a uniform process with clearly structured phases. In every phase, a project must fulfill precisely defined criteria before it can move on to the next phase. Step-by-step selection and focusing are essential to this process. About 3000 ideas are needed in order to launch *one* product.

In order to speed up the time-to-money, we are focusing at an early stage on the most promising research projects and driving them forward by focusing our resources on them.

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These three pillars ensure that we can capitalize in full on our innovative strength and hold our own successfully in the marketplace. How good are we at this?

You've already seen two successful products in the video. Some other outstanding examples have been awarded the Ciba Research Prize, which has been presented every year since 1998 for innovative technologies and breakthrough product developments. Let me give you just three examples:

- Innovative lactone chemistry for novel dyes and high-performance stabilizers for plastics.
- Novel NOR light stabilizers that make the plastic film used in greenhouses easier to process and more durable.
- And a whole range of water, grease and oil-repellant products both for fast-food packaging and for textiles.

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The digitalization of the world is proceeding at a breakneck pace. Ciba is an important player here too – in a gamut of products ranging from Ciba photoinitiators for printed-circuit boards to printer inks for digital ink-jet printing on paper or textiles.

I'd like to emphasize two examples with which Ciba opened up entirely new markets.

Ciba recognized the huge market potential of optical data storage when the concept of recordable CD-ROMs first cropped up in 1990. Since then we have brought several generations of high-performance dyes for use in this area to market, with great success.

Our functional dye, which the manufacturer applies to the polycarbonate disc in a thickness of 100 nanometers, is the CD's actual storage medium. During the recording process, a strong laser beam burns the information as a binary code into this thin dye layer. The process is very demanding in chemical and physical terms. The 52-fold recording speed, which is achievable today, is the equivalent of 200 kilometers an hour!

One of our latest products, IRGAPHOR Ultragreen MX launched in 1999, matches customers' ever higher expectations regarding photostability, the absorption spectrum and thermal properties. It is today, one of Ciba's fastest-selling products, with turnover of some 80 million Swiss francs. In 2002, more than six billion CD-R's were sold worldwide. Of these, about 60 percent used Ciba dyes. And our scientists are forging ahead with the next and even the next-but-one generation technologies.

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Ciba Specialty Chemicals has an equally strong position in color filters for liquid crystal displays. Laptops are inconceivable without liquid crystal displays, and they're even coming into their own for television screens. Ever brighter colors are much in demand. At the same time, the color displays being used, for instance in navigation systems, cameras or mobile phones, are becoming smaller and smaller. This miniaturization calls for even better resolution.

The demands made on these color filters are very high. The level of transparency must be extremely good to produce pure, clear colors. The fine color pixels demand excellent dispersibility. Lastly, the colors have to display a very high level of color fastness even in intensive use.

Ciba Specialty Chemicals is all the more proud that you'll hardly find a liquid crystal display anywhere in the world nowadays that doesn't contain our red pigment. Last year alone, the sales of this product doubled. And buoyant growth for the liquid crystal displays market is forecast for the future too. That's why we're not only further developing our red pigment, but are also targeting the market for green and blue color filters.

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This brings me to the third part of my talk, a look into the future. What are we doing to maintain and extend our innovative strength?

We are aiming to reduce development times through active research management. In the medium term, we want to increase the percentage of sales of innovative products and solutions that are less than five years old from the current level of about one fifth to one third.

In the "Managing for Growth" program that Armin Meyer has just presented, in the area of innovation we are therefore focusing on projects at an advanced stage that have considerable market potential.

We have set up the Ciba Research Fund in order to promote such innovative approaches. The fund spends 10 million Swiss francs a year to target new, breakthrough technologies. We also want to branch out into entirely new areas. These are veritable paradigm shifts that, it is recognized, could trigger innovation avalanches.

Three such futuristic areas in which Ciba is currently working are new laboratory techniques, nanotechnology and biocatalysis.

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The combination of combinatorial chemistry with high throughput screening is virtually a revolution in the research laboratory. The new techniques can accelerate the research and development process to an astounding degree. Using miniaturized and automated laboratory processes, large molecule libraries are synthesized on the principles of combinatorial chemistry, and these libraries are then tested in a very short time for particular effects by means of high throughput screening. This method has helped us discover new and promising molecules for new antimicrobials, for new pigments and even for new manufacturing processes for photoinitiators.

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Many experts consider nanotechnology to be a key technology of the 21st century. Thanks to its wide range of applications, it could change our lives even more radically than microelectronics has done.

Nanotechnology involves minuscule particles and structures: "nanos" means dwarf in Greek, and a nanometer is equivalent to one millionth of a millimeter. Ciba is active in this highly promising area as well. Our aim is to imitate nature and generate special effects with nanoparticles and nanostructures:

- The lotus, and other plants, uses nanostructures on its leaf surface to repel dirt and water. Following a similar principle, we are developing additives for car paints to which dirt practically does not adhere.
- Brilliant color effects like those of the butterfly are also based on nanostructures. Likewise, it will in future be possible to create color effects for printing inks, car paints, plastics and cosmetics by means of nanolayers.

All five Ciba segments are working on nanoscale technology and are generating synergies via a special network of competences. And, of course, we're working closely together with leading universities and research institutes.

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The third promising area I'd like to touch on is biotechnology, where Ciba is focusing primarily on biocatalysis.

In nature, enzymes control the chemical processes in the cells under normal pressure and temperature conditions. Biocatalysis uses such enzymes in order to greatly simplify the production of chemical substances, which would otherwise require several synthesis steps under special pressure and temperature conditions.

The technical foundations of biocatalysis have improved enormously in recent years and the technology is now ready for industrial use. By 2010, between 10 and 20 percent of chemicals will probably be produced by means of such biotechnology methods. Our team at Group Research is working on making selected production processes more environmentally compatible and more efficient through biocatalysis. A pilot project is currently being run at the Schweizerhalle kilo lab.

In the longer term, biotechnology has huge potential for Ciba Specialty Chemicals. Products from renewable raw materials may become important for our customers and hence for us as suppliers of specialty chemicals. We may one day see entirely new Ciba products developed from the millions of microorganisms, of which only a small part are known.

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Finally, what fascinates me about technical innovation is the interaction of creative and economical thinking. We must always be one step ahead of the market and our customers. And, at the same time, be prepared to take quantum, technological leaps.

We will continue to foster and nurture the culture of innovation at Ciba. Our employees are of paramount importance in this effort. They need an environment that enables them to provide top performance, that promotes the courage to take risks, that advances the exchange of know-how and that creates space for unconventional ideas. I am very proud of their achievement and their commitment.

The successful launch of 300 new products - and increasingly new technical services - in recent years is the best proof of our innovative strength.

All of us will uphold this spirit of innovative research and continue to fully exploit the creative energy within the company in the future.