

Pushing research to the bottom line

To state that companies in the technology sector do not invest enough money in research and development would be wrong. According to their annual reports, IBM spends about 5.8 billion US dollars, Hitachi 3.4 billion, Alcatel 1.9 billion and Lucent 1.2 billion on research and development each year. The question is whether they engage enough in basic research, compared with the development of new products. Here the situation might be less encouraging. It seems that to some degree basic industrial research is declining¹.

An oft-cited example is Bell Laboratories. For a large part of the past century, Bell Labs were a leading industry research lab with an impressive scientific track record, culminating in a total of 11 Nobel Prize winners. The labs were founded in 1925, out of a need to stay competitive when Alexander Graham Bell's original patents on the telephone expired. The response was the only sensible way: innovation. Bell Labs were particularly successful in this game.

However, following the end of AT&T's monopoly in 1984, funding of Bell Labs was reduced and many researchers left. This slow exodus grew worse when AT&T split off its manufacturing business, now Lucent Technologies. For its new owner, Bell Labs turned out to be a big burden on a company that was so much smaller than its parent. Indeed, Lucent never seemed able to capitalize fully on its research division.

In their present state, Bell Labs are at a key moment in their history. Lucent clearly wants to see more benefits from the labs, while at the same time finding itself unable to commit more financial resources. As a consequence, the exodus of talent from Murray Hill is seriously endangering the remaining scientific activities. This was the situation when Jeong Kim was appointed president of Bell Labs in April 2005. With energy and drive he set out to realize his vision, laid out in our interview with him on page 339². Most importantly, the aim is to 'align' Bell Labs research with the company's business activities and to provide a much stronger impact on the bottom line.

Another considerable recent change is a new strategy to attract more government funding. Although government research contracts have traditionally been strong at Bell Labs, their volume is expected to increase markedly. The argument is that Bell Labs are using outside sources to fund projects they would like to undertake anyway – something termed 'leveraged R&D'. It looks like a straightforward approach, with obvious benefits. But too strong a dependence on public funds could mean that the company finds itself in a weakened position. Basic research is often exploratory and without any immediate relevance to government activities and therefore not necessarily fundable by outside sources. Therefore it would be dangerous to make the labs too dependent on government interests and on a permanent inflow of government funds.

As this issue went to press, the merger of Lucent and Alcatel was just announced. The impact of this change in ownership on Bell Labs might not be apparent for a while, but the consequences could be profound, as the labs will have to be integrated into the research structure of the combined company. Furthermore, whether as a consequence of this merger government projects will be awarded as easily as hoped for is another open question.

Nevertheless, changes have to be made to ensure the labs' future, and the attempt to better integrate Bell Labs into the company's business follows the example of most other industrial labs, regardless of their tradition. At the same time it is important to find the right balance between basic and applied research. But even in the golden age research was not without constraints, as Walter Brattain, co-inventor of the transistor, remarked: "Many of the things that Bell Laboratories are proudest of now were done in spite of management"³.

At the moment, there is still excellent basic research performed at Bell Labs, and some of the old spirit has survived. Whether Bell Labs will manage this challenging financial and scientific turn-around remains to be seen, but it appears to be the only option left.



LUCENT TECHNOLOGIES INC./BELL LABS

BELL LABS HEADQUARTERS AT MURRAY HILL, N.J.

REFERENCES

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2. Interview. *Nature Mater.* **5**, 339–340 (2006).
3. Braun, E. & MacDonald, S. *Revolution in Miniature*. (Cambridge Univ. Press, Cambridge, 1978).