

- ▶ The main types of knowledge and how they can be best utilized and, as necessary, protected.
- ▶ The most appropriate ways to conduct market research into customers' and users' needs, so that radical innovations can be developed.
- ▶ If the strategic goals of the organization focus on achieving product and technology breakthroughs, then creative links need to be made between the strategy and the generation of ideas. This is the subject of the main case study for this chapter, which looks at Texas Instruments.

Management Recommendations

- ▶ Foster an understanding of the different types of creativity in your organization and use this to stimulate a constant flow of ideas.
- ▶ Take active steps to establish and constantly maintain a 'culture of innovation'.
- ▶ Promote the exchange of knowledge within and between innovation project teams. Recognize and protect knowledge that is vital to the organization.
- ▶ Employ an appropriate combination of market research and creativity techniques to identify your customers hidden needs.
- ▶ Identify suitable ways to protect innovative ideas from competitors.

Recommended Reading

- (1) Squires, S. and Byrne, B. (eds), *Creating Breakthrough Ideas: The Collaboration of Anthropologists and Designers in the Product Development Industry*. Bergin and Garvey: Westport Connecticut, USA, 2002, ISBN 0-89789-682-3. Interesting perspectives on how product design studies can be improved through ethnographic methods.
- (2) Couger, J.D., *Creative Problem Solving and Opportunity Finding*. Boyd and Fraser, 1995, ISBN 0-87709-752-6. Comprehensive coverage of many creativity techniques and their applications. Unfortunately, gives little information on empirical research into creativity.

Main Case Study **Texas Instruments – defining innovation**⁵⁷

Before reading this case, consider the following generic innovation management issues:

- ▶ How does the chosen innovation strategy impact the management of ideas?
- ▶ If end users do not understand the technology, how can they generate useful inputs for product designers?
- ▶ How can managers match market trends to technological advances?
- ▶ How can customers be encouraged to give ideas that are not simply based on improving current functionality?

Main Case Study *continued*

Texas Instruments Incorporated (TI) is based in Dallas. It is a world-leader in semiconductors, producing a wide range digital signal processing (DSP) and analogue devices and has over 34,000 employees worldwide. Revenues of \$8.4B were earned in 2002, of which a massive \$1.6B (19 per cent) was invested in R&D – a clear demonstration of TI's commitment to technology and new products. Its products provide the processing capability for a multitude of consumer devices such as mobile telephones, digital stereo, car navigation systems, interactive toys, and digital cameras. Developing technology that will satisfy the demands of manufacturers such as Nokia and NEC, technology experts themselves, constantly tests TI's ability to anticipate requirements. However, the company has a tradition of going beyond existing customer needs.

For example, TI is famous for developing the first integrated circuit (chip) in 1958. Back then inventor Jack Kilby knowingly broke 'the customer is always right' rule. He was specifically asked by a customer to develop some discrete circuits but he thought of how, by packing these onto a single piece of silicon, a more efficient overall device could be manufactured. As a result of his foresight, the applications of electronics have multiplied and, today, millions of chips are produced every day. A brilliant idea, for which Kilby won the 2000 Nobel Prize for physics, and the sort of feat that is difficult to repeat. Today, just as in 1958, it is important to exceed customer needs. But how can radical ideas be generated?

With the increased complexity of electronics, TI has recognized that technical intuition alone is seldom sufficient. Trying to extrapolate customer needs in the isolation of the laboratory was found to be too risky. 'For a while, we had a bunch of engineers who used to figure out what the customer wanted and throw it over the wall to the sales guys, who would figure out how to sell it . . . but not now', says Bob McKune with TI's Wireless Marketing team. Over the past ten years, TI has developed a variety of approaches to support the process of anticipating customers' needs and predicting technology trajectories. These are based around a new function and its interface to people in the business units, both in marketing and technology management.

Strategic Marketing

One of TI's most effective means for stimulating innovative ideas has been the Strategic Marketing function, which is staffed by technical, business and market experts. They collect and develop ideas for new markets and evaluate potential projects very much in the way venture capitalists work. The group was founded in 1998 and has been responsible for developing some major new businesses, such as the OMAP – family of applications processors for mobile telephones. Ideas are honed by comparing data from the market, technology and financial scenarios. Every idea has to undergo top-management scrutiny and, if approved, seed funding is available, resources are

Main Case Study continued

quickly identified and high-level priorities are set. To accelerate new business development attention is focused on the 'top-three priorities'. And to speed progress even further, the strategic marketing people most closely associated with the development of an idea transfer to the 'start-up' business unit. 'Being in one of the strategic marketing teams is about as close as you can get to external start-up mentality . . . inside of a big company', is how one of the original members of the OMAP team described it.

One of the ways Strategic Marketing and the business units go further than many of TI's competitors is in studying end-users and not just direct customers. It is recognized that end-users determine what will be needed in the future and, although these end-users understand little if any of the technology going into a mobile phone, for example, identifying trends in requirements is vital. Therefore, Strategic Marketing closely follows markets and conducts significant consumer research. Doug Rasor, VP of Strategic Marketing, says that understanding end-user trends helped TI recognize very early how 'the combination of convenience and increased functionality would transform gadgets from "luxury" or "techie" items to "must-haves" for today's busy consumer'. Similarly, tracking the consumer gave an early prediction of the need for every mobile phone to support high-quality photographic capability. Such insights into the world of the consumer have had a major impact on how TI products are designed, often pushing R&D to deliver what could be called 'over the horizon performance'.

Marketing and Lead Customers

Just as Strategic Marketing focus on new markets, marketing in the business units is tasked with developing ideas for radical new products. McKune says, 'TI has shifted to become not only technology-oriented but also customer- and end-user oriented'. In the process, new approaches have been adopted to help customers articulate the future and a strong focus on end-users comes from close cooperation with Strategic Marketing. Lead-user technique has also been used extensively and the view of McKune is that choosing the right people for lead-user groups is the critical part of the process. 'Literally, you have to look years ahead and a lot of our customers can only look out about 12 months. Others can only look out six months to the next introduction'. Therefore, 'industry thoroughbreds', as McKune calls them, are carefully chosen and experts are also brought in from related sectors. This stimulates broader discussions around technology and emerging customer issues, which in turn identifies real opportunities. Leading these discussions is a role shared by McKune and the Chief Technologist.

Chief Technologist

The Chief Technologist for the OMAP platform, Michael Yonker, works in an office directly opposite to McKune's. Their respective doors are always open

Main Case Study *continued*

and they constantly trade jokes, accusing each other of either an inability to properly interpret the market, the technology, or both. Behind the jest, however, both Yonker and McKune are very serious about their goal of matching future technology to hidden needs. Yonker describes his role as 'the technical guy, who also understands the business side and who has a prominent role with our customers. In a sense I have to bridge the gap, acting as an evangelist to both R&D [convincing them about the importance of interpreting and leading the market] and marketing [convincing them of the potential of new technology]'.

'A lot of technology managers are pure R, or pure D but I put a premium on internal and external communication', says Yonker. Product technology roadmaps are used extensively as an internal planning and communication tool. By using roadmaps to show the links between the market and technology, Yonker aims to avoid 'technology being developed that is not effectively applied. That's what we call 'nerd products' – nobody wants to buy them and we don't want to develop them'. This in turn has led to the 'customer is always right' rule being broken regularly. Usually customers have a tendency to demand ever more functionality. However, McKune and Yonker have found that appropriate communication can identify product simplification opportunities. Removing product features can be a tough negotiation with customers but when all five key criteria – cost; size, weight and volume; power consumption; performance; and time-to-market – are discussed in unison, as opposed to features alone, TI have found that interesting alternatives emerge more easily than might be expected. 'Through introducing this broader view and discussing all five criteria with customers, the whole technical thing has taken on a different light', says Yonker.

Innovation: Define not Refine

In common with their competitors, each year TI is introducing new chips that are half the size, one-quarter of the price of previous ones, and have half the power requirement (and therefore require fewer battery changes). In terms of performance, however, the work of Strategic Marketing, lead-user discussions and end-user studies are providing TI with ideas for exceeding expectations. For example, the OMAP – team is now working on a 'super-chip', which will offer manufacturers the capability of designing all of the features they want to include in a mobile telephone from voice-only to multimedia. This is one product but the result of what Yonker and McKune see as the clear innovation philosophy of their business unit; 'our goal is to *define* new customer needs, not just *refine* existing ones'.