

Navigating the technology maze



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Pharmaceutical companies must continually improve their R&D productivity to maintain their growth and profitability. This financial imperative demands that they launch fivefold more 'blockbuster' drugs (those with yearly sales of US\$500 million or more). Achieving this goal is the primary impetus for industry-wide efforts to renovate and reinvigorate their R&D (Ref. 1).

Dichotomy and importance of new technologies

For R&D managers, technology can be a boon or a burden. Technology spawns discovery when it changes fundamentally the successful practice of science. For this reason, drastic technological change propels most revolutionary advancements. Choosing technologies that best fit current research efforts ignites innovation and increases R&D efficiency and effectiveness. By contrast, choosing an inappropriate technology smothers creativity. Moreover, the costs of embracing defective or ineffective technologies can be devastating.

Essential R&D components include efficient, effective strategies; decisive, inspired leadership; motivated, creative people; thoughtful, innovative science; timely, informed decision making; and flexible, enabling technologies. Especially crucial is technology, because it narrows the focus: without the focal point of technology, strategy is ineffective, leadership is weakened, science is undermined and decision making is compromised. For this reason, organizations seek technologies that will revitalize their R&D. Ironically, using technology to arbitrate change is often effective, yet potentially disastrous.

Identifying new technologies

Pharmaceutical companies face difficult and complex decisions when identifying, evaluating and selecting new technologies to apply to their R&D. The majority of technologies that yield truly novel products originate in other companies and often in other industries. Finding valuable opportunities requires broad networks, deep insights and expansive thinking. Most enabling innovations draw on inventions from fields outside their ultimate areas of application. The most effective technological advancements often unite concepts and components from diverse areas including physics, chemistry, biology, electronics, engineering, computer science, material science, optics, micro-fabrication and information science.

Such important and challenging problems demand technology development and acquisition professionals. PE Biosystems employs a separate and interdependent group – *Science and Technology* – to identify, develop, evaluate and select technologies that could lead to novel, innovative products. The group's activities provide a valuable case study on the technology acquisition process and their experiences emphasize the crucial importance of several technology management practices.

Technology management practices

Broaden technology review

Broadening the search for new technologies requires an understanding of the needs of R&D from a generic point of view. This increases the probability of identifying technologies from other fields that could solve customers' technical problems. For example, in the development of new systems for scanning hybridization arrays and imaging cells at PE Biosystems, technologies currently used for surface analysis and medical diagnostics were reviewed.

Maintaining a comprehensive database

To maximize the efficiency of the process, a comprehensive, up-to-date, centralized database should be maintained. This is crucial in a large company, where several people from different parts of the organization often interact with the same technology source. When new problems arise, a database search

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sometimes identifies a solution. Database information often provides a starting point for the project.

Employing a taskforce of experts

Gaining an understanding of the status and promise of a technology requires a taskforce of experts, each responsible for their own area of technical expertise. This strategy is key to the overall efficiency and effectiveness of the process. When evaluators lack in-depth knowledge and experience in a crucial area, they can overlook vital issues, fail to address important questions and oversimplify complex problems.

Involving people who apply technologies

To improve the match between technological solutions and R&D needs early in the evaluation process, the people who will ultimately apply the technology should be involved. By asking key qualifying questions, they can often eliminate technologies from further consideration and highlight technologies with the greatest value and promise. Early involvement of the ultimate users helps identify 'champions', which is equally important. The champion secures the resources required for its acquisition and development.

Including market analysis in technology evaluations

Marketing early in the evaluation process ensures that products produced from new technologies match customer needs. As technology and customer needs evolve over time, technical and market experts should work together to understand how these needs co-evolve. Finding current technology to meet today's needs is relatively easy compared with predicting how future technology will meet future needs.

Building intellectual property portfolios and distinctive competencies

Meticulously scrutinizing the intellectual property estates surrounding the technologies of interest secures competitive advantage and minimizes patent conflicts. When a clear opportunity is seen, the complementarity between the new technologies and existing intellectual property, know-how and expertise should be explored. The overriding goal is to build distinctive competence that yields genuine competitive advantage. Technologies that add significantly to a current competitive position or that present significant new opportunities for building new positions should be a high priority.

Continually evaluating key technology areas

To leverage growing knowledge and understanding, selected technologies should be periodically revisited. Just as technologies evolve over time, so do technology requirements. After the first evaluation, a future re-evaluation to determine if key

feasibility studies were successful and check for unanticipated breakthroughs should be scheduled.

Employing open decision-making

To ensure that good decisions are made most of the time and to de-politicize the process, open decision-making should be employed. Everyone involved agrees on the criteria that will be applied. All information, analysis and opinion is shared and documented. In addition to return-on-investment analysis, the greater strategic and tactical value of the technology should be assessed.

Conclusions

The complexity of technology management highlights the need for technology acquisition professionals. Enabling technologies fuel the innovation engine and generate opportunities and information that improve decision-making.

Choosing the appropriate technology for pharmaceutical R&D demands full-time, professional attention. Sophisticated organizations accept this tenet and employ dedicated technology managers. Although most organizations recognize the importance of the aforementioned management practices, few organizations employ all of them.

In an era already spinning from an accelerating pace of change, the pharmaceutical industry lies within a complex maze, one shaped by social, economic, political and technical forces. Successfully navigating this maze demands many types of leadership, including technology leadership.

REFERENCE

- 1 Anon (2000) Rapid rise in NCEs in trials by 2008. *SCRIP* 12, 2530

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Collaboration...

ICAgen (Research Triangle Park, NC, USA) and **Yamanouchi Pharmaceutical Co. Ltd** (Tokyo, Japan) have entered into a collaboration to develop novel CNS therapeutics. The collaboration will involve the use of ICAgen's proprietary ion-channel technology. Under the terms of this agreement, ICAgen will receive precommercialization payments including an up-front payment, research funding and milestones, as well as royalties on products commercialized by Yamanouchi. They can also develop and commercialize products for certain CNS indications and commercialize products not pursued by Yamanouchi.