Editorial

Biotechnology commercialisation: Getting past the technology-push

A common mantra in entrepreneurship is that focusing on a market–pull – searching for solutions to satisfy unmet market needs – is preferable to a technology–push – searching for applications of a novel technology. The logic is that focusing on a market–pull ensures that there will be customers (although the ability to produce the technology at a profit–enabling price is not certain). A technology–push provides greater certainty of the utility and cost of delivery, but suffers the risk that customers willing and able to pay a profit-enabling price may not exist.

Biotechnology is, by its very nature, innovative. Biotechnology companies put great efforts into developing novel technologies and rely on intellectual property protection to protect their markets. It is no surprise then that the majority of biotechnology business models rely on a strong technology–push component. An exacerbating factor is that while development costs in biotechnology are difficult to predict – a challenge also shared by traditional technology development – the feasibility of technology development is also uncertain. This means that an emerging product–developing biotechnology firm may have uncertainty in the feasibility of its product, the cost to develop its product, the cost to produce its product, the market for its product, the path to consumers, and the price they will pay. These stacked challenges leave the biotechnology manager with an excess of independent variables to consider in making resource-allocation and R&D management decisions.

Confounding this managerial nightmare is the steep learning curve for biotechnology managers. Years of education and work experience are required to attain the scientific prowess and practical commercial knowledge essential for success. Furthermore, how many people with well-developed skills in these areas are willing to take the risk and face the long hours and stress typical of start-up environments? The outcome is that a majority of nascent biotechnology companies are led by individuals only part-way along their educational and skill-development paths who may struggle to understand the full scope of the commercial environment in which they operate. This is borne out in a recent study[1] which found that biotechnology company managers were fixated on a technology-push approach and lacked an understanding of integrated innovation.

One of the solutions to the management learning curve, as I suggested in my previous editorial,[2] is to aggressively pursue continuing education. Addressing the technology-push is a more complicated issue. The first step to getting past the technology-push in biotechnology is recognising the problem. As stated above, the innovative nature of biotechnology, and the general paradigm in which biotechnology companies form to exploit new technological developments, implies that most business plans have a strong technology-push component. Recognising this inherent bias, the next step is to rigorously identify and test assumptions regarding the marketability of developed technologies. Often compromises will be necessary due to operational or funding constraints, and decisions may have to be made without sufficient time or

information to fully evaluate the options and potential outcomes. The key is to be aware of, and anticipate, the challenges that may emerge. Jazz musician Miles Davis once said 'When you hit a wrong note it's the next note that makes it good or bad'. The same can be said for biotechnology business development. Challenges will emerge. The key is to be prepared, and react and improvise as necessary.

REFERENCES

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2. Friedman, Y. (2008). Continuing education in biotechnology. *J. Comm. Biotechnol.* **14**, 275–276.

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