

Editorial

NEXT = new events in xurgical technology[☆]

The 23rd Annual Meeting of the European Association for Cardio-Thoracic Surgery to be held in Geneva, September 11–14, 2010 (www.eacts.org) is the event to find out all about what is NEXT, i.e. New Events in Xurgical Technology. As everyone knows surgery has its origin in the Greek term χειρουργική (*cheirourgikē*) which means 'hand work'. Further enhancement of what can be done manually requires instruments or, in other words, technology. In addition, problems with technology are usually approached with more technology. As a matter of fact, cardiac, thoracic and vascular surgeries are very technology driven fields and there are a numerous examples in this volume of the European Journal of Cardio-Thoracic Journal [1–7], etc.).

One key issue is of course how to get from a good idea for a new surgical device [6] to an approved implant or instrument which can be used in routine fashion for the clinical practice? There have been two interesting papers in the recent issues of the European Journal for Cardio-Thoracic Surgery by Vecht et al. showing first, how to protect one's assets by securing the intellectual property [8], and second how typical pathways for prototyping, certification, manufacturing, marketing, and financing [9] can look like.

Basically, there are two concepts for financial engineering around the creation of a start-up company for the NEXT product. Either the 'self-financed' route which may involve the family and friends versus the totally 'venture capital financed' route.

The venture capital financed route requires a good story and a lot of effort to convince the fund managers. It may allow for attracting big investments, which in conjunction with a brilliant team can shorten the time to market by parallel processing, and a global roll-out. It can potentially generate huge returns. The main price for this strategy is, that the inventor is usually removed from the commands early on, his holdings are diluted accordingly or vice versa, and the initial spirit of the invention may be completely lost. Hence, it is of prime importance for the inventor to negotiate adequate rewards for his contributions from the very beginning.

In contrast, the self-financed route is an extremely tedious one. Most of the problems occurring at the various levels of development, certification, production, marketing and sales have to be solved typically by the few persons in

the team. This is due to the fact that such small operations are usually short of cash, which provides the necessary pressure to find efficient solutions (positive), but big jumps are just out of question (negative). Potential suppliers as well as customers have to be convinced almost one by one, which in turn slows down the penetration of the markets even if an innovative well functioning product can be made available readily. Hence, the financial compensations early on are none or insignificant as compared to a well negotiated deal for the scenario outlined above, but, it is possible to stay in control of the entire operation for the time it takes, and thus after all the final reward may turn out to be superior.

Of course there are all sorts of combinations in-between these two scenarios, but not all products are suitable for both. Typically, the development, production, and marketing of an artificial heart [10] or even a prosthetic heart valve [11] can rarely be financed out of one single pocket, and in order to get somewhere, multiple rounds of investments by organizations willing to take some risks are unavoidable. In contrast, it is still possible for relatively simple devices [12], to evolve under the inventor's direction at a much smaller scale, and of course, slower pace. In the latter case limited funding from start-up friendly foundations and government agencies which do not have too many strings attached can be of major help for scientific proof of principle (e.g. Swiss National Science Foundation: www.snf.ch, and the equivalents in other countries) or processing clearly defined work packages for industrialization (e.g. Swiss confederation innovation promotion agency: www.CTStartup.ch, and the equivalents in other countries).

The emerging discipline of Venture Philanthropy provides a promising third option along with self-funding and traditional venture capital investment. Not-for-profit organizations can put their considerable resources into play, in ways consistent with their mission, at a time in product development that is too early for traditional venture investment and too late for academic funding. While such organizations invest instead of giving grants, they do so with an eye toward re-distributing profits to evergreen funds to use for future investments always within their philanthropic goals. In this way they help to bridge the so-called translation gap, the transition in product development between bench and bedside where financing is known to be difficult. In cardio-vascular disease, Broadview Ventures (www.broadviewventures.org) has been established by the trust that

[☆] Conflict of interest: LKvS is founder and shareholder of Smartcanula LLC, Lausanne, Switzerland.

funds the Fondation Leducq (www.flcq.org) to address just this problem. With a mission to accelerate the development of technology in diagnosis and treatment of cardio-vascular and neuro-vascular diseases through targeted investments, Broadview aims to make resources available to inventors and early stage companies to help to insure that promising technology can move forward. Ultimately, this is in everyone's interest.

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Ludwig K. von Segesser*

*Department of Cardio-Vascular Surgery, CHUV,
Rue du Bugnon 46, 1011, Switzerland*

*Corresponding author. Tel.: +41 21 3142279/3142280;

fax: +41 21 3142278

E-mail address: Ludwig.von-segesser@chuv.ch