**CASE STUDY 10**

**Exploring Innovation in Action – Evolving Knowledge Needs of a New Venture**

Helax AB was founded in 1986 by three staff of Uppsala University in Sweden. The three founders had degrees in physics, mathematics and computer science, and had experience of using IT in medical applications, in particular radiotherapy. The founders successfully raised US$3 million of venture capital from private and government sources, enough for three years of working capital without any additional revenues.

The idea for the business originated in a public-funded research project called CART (Computer Aided Radio Therapy), which aimed to create an integrated information management system for the records of cancer patients. This was believed to be desirable because such patients usually undertook a wide range of different examinations, scans, diagnosis and treatments over an extended period. By combining and tracking these data, it was hoped that the overall effectiveness of the therapy would be improved. The CART project successfully demonstrated that the success of therapy could be improved through better management of the patient data, identified user requirements for such a system, and had developed a number of the software subsystems and components necessary to begin building a more integrated information management system. However, CART did not go as far as hoped, and never developed a functioning integrated system. Helax AB was created to take the work further, and to develop commercial applications.

So at start-up the three founders of the company inherited knowledge of the problem area, user requirements, and most importantly had formal knowledge relevant to potential solutions within the combined fields of computer science, mathematics and physics. Based on the results of the CART project, a process map of the clinical process was developed, independent of any systems design. This was circulated to 30 international cancer centres for feedback, and this quasi-Delphi survey also helped to create potential customer awareness and buy-in for the future. The feedback was positive, and provided the basis for further development of the system. In 1988 the technology was installed in two hospitals for clinical trials and evaluation. At the core of this design was the dose planning system, later to be renamed the TMS (Treatment Management System). This architecture allowed Helax AB to act as a systems integrator by adding further components from other providers and partners.

The potential solution had two very different components. The first was specific to radiotherapy and concerned the planning of dosage levels. Dose planning requires knowledge of the relationship between radiation levels and patterns and their effects on biological tissues and cells. This subject had been explored in a PhD project jointly funded by Helax AB and Uppsala University. The second area of knowledge was more generic, and concerned with information management. These two fields of knowledge evolved in different ways as the new venture developed. The first was based on the knowledge generated and accumulated from the CART research, plus access to an extended external network of scientific research and clinical expertise. The second was more internal, but required extension by further recruitment.

Development was grouped into three different areas: hardware and operating systems architecture; software for the user interfaces; and quite separately, the development of the algorithms for calculating the doses, which required access to more basic science. Within a year the whole CART project group of 13 from Uppsala University had joined Helax AB, and in addition engineers with product development and commercial experience were recruited to help in design and development, bringing the total number of employees to 20 by 1990. Almost all employees had degrees, mainly in the physical sciences or engineering, but the company decided not to recruit medical expertise. Instead, it relied on a network of contacts in the medical community. By this time the original venture capital funding had been exhausted, and arguments between the founders and venture capital owners over the future direction of the firm resulted in the founders buying out the venture capitalists interest in the firm.

By 1994 the company had installed its system in 11 of the 15 radiotherapy centres in Sweden, and had also achieved some sales in Germany and the UK. During this period the company developed some new knowledge and capabilities in production, and had an annual capacity to build 12 systems. However, in product development most of the knowledge-seeking effort was within the existing system design, and was aimed at fixing bugs and improving performance of the existing system by refining the dose algorithms. To extend its sales and international reach further, it established partnerships with Siemens, Philips and General Electric. This was rather too successful, and in the first six months of the Siemens partnership 60 new systems were ordered, equivalent to five years of production. Therefore Helax had to fundamentally change how it produced and installed the systems, and the increasing customer base demand created a need for maintenance, service and support for the installed systems. Initially the system developers had undertaken the new service and support function, but this placed strains on product development, and so the firm had to create a new service division and recruit new personnel with the relevant skills and experience.

The additional revenues from these sales allowed Helax to invest in research and development, and two product extensions were successfully launched between 1994 and 1998. Customers were demanding more standard interfaces compatible with Windows PCs, rather than the purpose-built and non-standard interface offered. These more fundamental attempts to upgrade and change the software failed, and Helax experienced significant problems recruiting and retaining the necessary staff experienced in more structured software development. The legacy of the unstructured development approach of the original founders and CART team resulted in under-investment in formal software engineering, and attempts to out-source this development had also failed.

The company continued to develop sales subsidiaries in Northern Europe, and extended its product market into other fields such as oncology with the development of the HOME (Helax Oncology Management Environment) system. However, efforts to enter the critical US market were not successful, and in return for access to North America Helax sold out to the Canadian firm MDS Nordion. Helax in Uppsala is now a division of MDS Nordion, and a centre of excellence for the development of the HOME concept. The identity and knowledge of the founding group remains, but autonomy and control do not: ‘the 20 first employees have become, and still are, the core of the company. [But they have not] broadened their core function since they started, but have become mentors in the company’s main process, i.e. the development of a system of radiography … but I don’t think it is possible to break up and get the individuals to work together in a different perspective. ([p. 422](http://devry.vitalsource.com/books/9781119961987/content/id/pg422))

Therefore over its 15-year life as an independent new venture, the knowledge needs of Helax have changed significantly. The new venture was founded based on the formal knowledge outputs of the CART research project, and the explicit knowledge of the three founders in the fields of physics, computer science and mathematics, plus their experience in the domains of informatics and radiography. The core knowledge base of the new venture was, and largely remained, a detailed knowledge of the whole radiography process, combined with the specific knowledge of dose planning. Over time, the need for new internal knowledge of production systems and formal software development and engineering grew, and to a great extent these had to be satisfied by the recruitment of new staff with knowledge and experience of these fields. In addition, a wide range of external sources of knowledge had to be utilised to help translate the technology into a successful commercial venture. These included the local networks within medical research and clinical practice, and international networks for cancer treatment. The need for specialist national and product market knowledge and access demanded partnerships with large multinationals, and culminated in the sale of the company and loss of control.

**Questions**

1.

Identify the different types of knowledge needed throughout the growth of the new venture.