

Chapter 6

The Development of Emerging Medical Devices: The Lead–User Method in Practice

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ABSTRACT

This case study explores the application of the Lead-user method in the development of medical applications based on Wireless Sensor Network (WSN) technology by three independent research teams. This exercise produced surprising results, with the emergence of diverse WSN technology product concepts applied to Geriatric Falls Detection & Analysis, Sport Cardiac Screening and Critical Care Vital signs within accident and emergency environments. This case highlights the segmented nature of medical areas and the difficulty in applying a generic WSN technology to meet the functional requirements of the broader individual medical domains. It questions the appropriateness of applying ‘total’ highly functional technologies broadly across highly specialised niche medical areas.

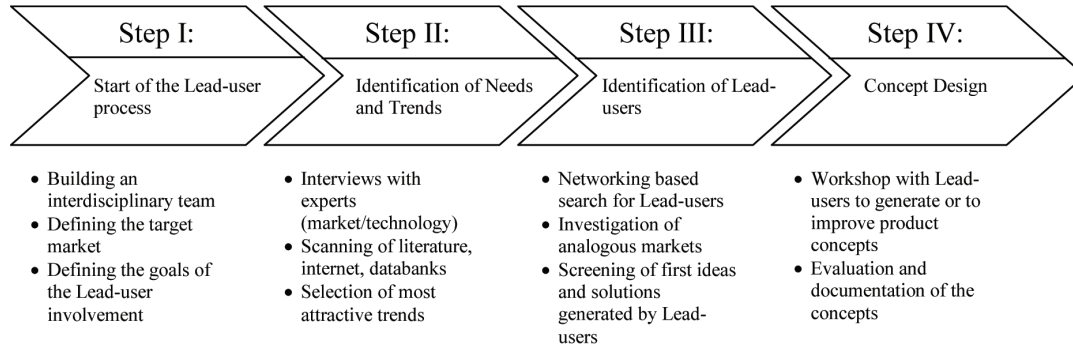
BACKGROUND

This case outlines the experiences of three Post-graduate Innovation teams, students on a one-year taught masters programme that are required to ‘build products and services that don’t exist yet.’ The Masters programme, which targets technology graduates, includes a significant innovation component requiring the teams to validate market existence and develop a prototype and business plan with the assistance of an industry mentor. The students

respond very well to the Lead-user Method, the 3M case study and the accompanying videos on Eric Von Hippel’s website. These research innovation teams were created to explore the potential role of wireless sensor network (WSN) technology in the medical area. The teams independently focussed on three distinct areas, namely: 1) Geriatric Falls Detection & Analysis; 2) Sport Cardiac Screening; and 3) Critical Care Vital signs within accident and emergency environments. Each of the teams operated independently of each other as to not taint or indirectly alter one another’s perceptions of their individual application areas. Each team consisted

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Figure 1. The process of the lead-user method



of five members with diverse backgrounds from commerce, electric and electronic engineering, and computer science. Subsequently each team was assigned an industry mentor to help guide them on a viable commercial path. Finally all three teams were lead by two project managers Dr. Dan Nielsen (technical lead) and Dr. Miyagi (product innovation).

The Lead-user process has been successfully adopted within a diverse range of application domains i.e. development of medical equipment technology (Lettl, et. al., 2006), medical infection control devices in 3M (Von Hippel, 1999), weblog technology (Kaiser, et. al., 2008) and extreme sports communities (Schreier, et. al., 2007). It was selected as the process to help guide each of the three teams in developing potentially successful commercial products/services (Von Hippel, 1998), (Franke, et. al., 2006). The ‘functional’ source of innovation provides a good starting point for innovation teams to explore the relationship between innovator and innovation. (Von Hippel, 1998) defines innovation as anything new that is actually used (“enters the marketplace”), whether major or minor. A distinction is made between a ‘user’ and ‘manufacturer’ innovation. With ‘user’ innovation the developer expects to benefit by using it and in the case of a ‘manufacturer’ innovation the developer expects to benefit by selling it. The

Lead-user method has developed into a four stage approach (cf. Figure 1), which includes I) Start of Lead-user process, II) Identification of Needs and Trends, III) Identification of Lead-users & IV) Concept Design using Lead-expert workshops (Lettl, et. al., 2006).

The high failure rate or lack of commercial success of a number of innovate products/services in the market place are a great cause of concern (Hassan, 2008). Non-Lead-users tend to be technology driven (to maximise their current skill or resource sets) this results in a lost opportunity as they struggle to grasp the true functional requirements of the Lead-user and build what they perceive is the correct product or service. This in turn results in a large number of unsuccessful product/services entering the market place.

The work of Eric Von Hippel (1986, 1988) makes a number of significant contributions to technology entrepreneurship and innovation. The first and less highlighted is the critical nature of correctly sourcing innovation depending on the domain area in question, which is an important first step in any opportunity recognition exercise. The next contribution is the Lead-user method, which built on innovation sourcing, identifies specific individuals in domains, such as, extreme sports, scientific instruments, etc., who have unmet needs and are in a position to address them.

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