Medical Device Innovation

The integrated processes of invention, diffusion and deployment

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Akademiisk avhandling

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Abstract

An increased use of medical devices has been assumed to be a major cause of rising healthcare expenditures. Nations around the world are trying to keep costs down, but strong incentives still exist for the development and use of new devices. Innovation is, however, never exclusively good or bad and it is not easy to evaluate the net effect. Theories and empirical research on innovation have been produced for more than 100 years. In this, the diffusion of innovations has attracted the most interest, while other areas such as the integration of technologies have been less thoroughly researched.

This thesis presents a model of medical device innovation in hospitals – from the first idea and invention effort to regular use of a new technology. The suggested model is built on three fundamentals: (1) academic innovation literature, (2) empirical studies, and (3) observations of on-going innovation processes. The model is a synthesis of the accumulated knowledge in different innovation research traditions, and of empirical studies of the Swedish healthcare system and the medical device industry. The aim is to give a comprehensive picture of the innovation process, and to provide a theoretical model, which can be used for studying and influencing the path of medical device innovations into healthcare practice.

In order to achieve a balanced rate of change, with long-term societal benefits, an interdisciplinary approach is necessary in the planning and regulation of medical device innovation. The new model combines academic views with political/entrepreneurial and healthcare views. Innovation, in this model, is suggested to occur in three integrated activity domains: invention, diffusion, and deployment. A great number of factors that influence these activities are investigated and described, and different roles and incentives are discussed. Deviations from traditional innovation theory are for example: (a) integration of invention activities as having an impact on later events; (b) inclusion of the inventor/developer as a main actor also in the diffusion and deployment domains; (c) increased focus of the concept of technology cluster innovation, and (d) the rationality of use as a factor in estimation of the consequences of innovation.

Finally, the thesis suggests a number of model and methodology improvements and policy implications for management of innovation in hospitals.