

## Changes in Innovation

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# Changes in Innovation

## Towards an Improved Understanding of Economic Renewal

Edited by

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and

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# Notes on the Contributors

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**Nina Rilla** works as a research scientist at VTT within the team 'Innovation and Industrial Renewal'. Her research interest lies in the field of industrial innovation, as well as on internationalization of companies and their innovation activities, and R&D in general. She has focused on investigating the changes in the innovation process, particularly from an innovation networks' and innovation failure's perspective.

**Jani Saarinen** works as innovation and technology policy manager at PricewaterhouseCoopers. Trained in both research policy and economic history, Saarinen studies innovation at the intersection of science, technology, and industry. His work includes extensive studies of industrial research and development, commercialization and business models of innovation, the development of manufacturing technology in Finland, and studies related to innovation and technology policies. In addition, he has expertise in innovation activities and technological evolution of firms and industries, long-term changes in the nature of R&D activities of firms and research centres, and also various issues related to patents and human capital.

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# Preface

Thomas Alva Edison created several inventions in the field of telecommunications during the 1860s and 1870s. After realizing the commercial potential of his inventions, and with the help of the money he received in exchange for the rights for many of his patents, Edison decided to support and manage the creation of novel solutions more professionally. In 1876 he set up an R&D laboratory in Menlo Park, New Jersey, being the first of a kind in the USA, bringing together multidisciplinary knowledge and resources needed to facilitate innovation.

After a few years Edison introduced his most well-known achievement, the electric light bulb. Although Edison and his workers did not invent the first electric light bulb, with the help of a clear strategy of combining the existing knowledge and the capabilities of his laboratory, they created the first commercially viable incandescent light bulb. Edison's vision of electric lighting having the potential to be utilized by common people came to fruition after continuous improvement.

However, the lack of an energy supply and distribution system hindered the wider diffusion of innovation. Thus Edison needed to come up with new types of innovations supporting the core product. In 1878, he formed an electrical company in New York City, and couple of years later introduced a process innovation: the world's first economically viable system of centrally generating and distributing electric light, heat and power. This enabled the wide implementation of single light bulbs and can be regarded as the innovation having far greater impact on society than the light bulb used in the electrical system. Furthermore, it enabled Edison to create new services such as providing electricity to street lamps.

Despite the success in inventing and innovating, Edison encountered challenges and even failure, both in developing an innovation and in business. For instance, in the case of light bulb, Edison tested thousands of filaments before he discovered a carbonized bamboo filament that could last over 1200 hours. However, he saw failure quite differently, saying that, 'I have not failed. I've just found 10,000 ways that won't work.' In business, his idea to create a practical way to mine iron ore was never realized, leading Edison to lose the money he invested in the company behind the development. Yet, Edison can

be regarded as a distinguished innovator. Not because of the many inventions he developed or of the many patents he possessed, bought and sold, but most of all because, unlike his peers developing new technology at the time, he focused on creating applicable and commercial solutions.

The electric light bulb is still widely used in household and commercial lighting, even though its product life cycle seems to be coming to an end. New product innovations, namely and mostly compact fluorescent lamps (energy-saving lights) and LED lights, are replacing the mature light bulb technology.

The case of Thomas Alva Edison elucidates well the complex nature of innovation and the various points of view from which it can be approached. Now, 130 years after Edison's first successful test of a light bulb with a carbon filament, the innovation phenomenon appears an ever more diverse and complex issue. However, the nature and many aspects of innovation illustrated in the case of Edison are still present and dealt with in this book; facets ranging from the influence of local circumstances, effort of learning and building up new knowledge, creating value from services, entrepreneurial endeavours and the like. Not surprisingly then, innovation as a phenomenon can be best understood from more than one perspective.

A multidisciplinary innovation studies tradition has been built at VTT Technical Research Centre of Finland during the past seventeen years. The research on which this book is based has been carried out over a four-year period in two wider research projects, which concentrated on examining changes in innovation and innovation processes. Not only have we been able to conduct interesting research on changes in innovation processes, but, significantly, we have been engaged with, and one could even say educated in, the field of innovation studies.

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We also acknowledge the lively and fruitful discussions among our innovation studies colleagues at VTT and Helsinki University of

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