



Consumer Product Innovation and Sustainable Design: The Evolution and Impacts of Successful Products

By Robin Roy

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Consumer Product Innovation and Sustainable Design follows the innovation and evolution of six consumer products - bicycles, washing machines, vacuum cleaners, television and mobile phones - from their original inventions to the present day. It discusses how environmental concerns and legislation have influenced their design and the profound effects these products have had on society and culture. This book also uses the lessons from the successes and failures of examples of these consumer products to draw out practical guidelines for designers, engineers, marketers and managers on how to become more effective at product development, innovation and designing for environmental sustainability.

Chapter 1 Patterns of innovation

This chapter introduces the book's inspiration from the British consumer magazine, *Which?* that provides a unique record of the technological innovation and design evolution of consumer durables sold in Britain since 1957. The chapter summarises the criteria used to choose the products that are the subject of the case study chapters of the book. A typical pattern of innovation of a consumer product - initial divergent experimentation, establishment of a dominant design, and further innovative design - is provided by a case study of bicycles.

Chapter 2 Washing machines

This chapter discusses evolution of electric washing machines from their origins in 19th Century manual washing machines to their convergence onto currently dominant front and top loading configurations. The chapter discusses the environmental impacts of washing machines and effects of environmental regulations on their design. It discusses social and cultural influences on laundry habits and future innovations in laundering.

Chapter 3 Lamps and lighting

This chapter discusses the invention of the electric lamp and its innovation and

design evolution through several technologies - incandescent, tungsten halogen, fluorescent, compact fluorescent and LED lamps. The chapter discusses the influence of environmental regulation on electric lighting technologies and factors influencing consumer adoption of energy saving lamps.

Chapter 4 Television

This chapter discusses the technological innovation of television equipment from early electro-mechanical systems, through black and white and colour analogue electronic systems, to digital and high definition television (HDTV) together with the parallel design evolution of television receivers. The effects of environmental regulation on the energy use of television equipment, and some of television's socio-cultural impacts are outlined.

Chapter 5 Vacuum cleaners

This chapter discusses the technological and design evolution of vacuum cleaners from their invention to their convergence on two dominant designs - upright and cylinder configurations. A case study of Dyson's disruptive innovation of a cyclonic cleaner shows how this led to the industry developing a variety of bagless, cyclonic, robotic and cordless vacuum cleaners. The chapter notes how adoption of vacuum cleaners has been influenced by economic and social factors such as affordability and attitudes towards cleanliness and housework.

Chapter 6 Mobile phones

This chapter discusses the evolution of mobile (cell) phones from car radio telephones through the first analogue portable handsets to digital mobile phones using 2G, 3G and 4G technologies and the parallel design evolution of the handsets. The chapter discusses environmental impacts and the social and behavioural effects of smartphones and introduces some likely future technological developments in mobile communications.

Chapter 7 Lessons for product developers and innovators

This final chapter draws out conclusions about patterns of technological innovation and design evolution, plus practical lessons and guidelines for product designers, engineers and managers, from the information provided by the book's consumer product case studies.

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Editorial Review

Review

‘Robin Roy has written intriguing histories of a selection of consumer products – washing machines, lamps and lighting, televisions, vacuum cleaners and mobile phones – looking at the patterns of their technical evolution and the causes of success and failure. He puts special emphasis on the environmental impacts of designs including their use of energy and materials. Professor Roy with his lifetime experience of studying product innovation is uniquely qualified to write this book that will fascinate the general reader and be particularly useful in teaching, design and industry.’ - *Professor Philip Steadman, Energy Institute, University College London, UK*

‘Consumer Product Innovation and Sustainable Design is a fascinating and incredibly useful book that builds upon a significant amount of research from the author. Its focus around five types of products provides the reader with both a set of interesting histories but also design case studies which will be particularly useful for students and practitioners. The focus on sustainable design within these case studies helps the reader understand the subject within the context of product innovation. This book should become essential reading for all product designers no matter what career stage they are at.’ - *Professor Tracy Bhamra, Loughborough University, UK*

‘By combining the archives of Which? Magazine with an analysis of the evolution of popular consumer product categories *Consumer Product Innovation and Sustainable Design* reminds us why the things around us have the capacity not just to shape our own lives, but that increasingly it is how a product uses our limited resources efficiently that is the key to success. Robin Roy has produced a book that will be invaluable to product designers and others in thinking innovatively and responsibly in determining tomorrow’s good designs.’ - *Peter Lloyd, Professor of Design and Associate Dean, University of Brighton, UK*

‘*Consumer Product Innovation and Sustainable Design* draws on a huge amount of research and experience from the author and is based on a series of solid cases on the innovation process associated with five consumer products. Of particular note is integration of environmental considerations into the analyses and the final section on lessons for product developers and innovators. This book will be an essential resource for both practitioners and researchers interested in learning lessons on the evolution of innovation of ‘active’ consumer products.’ - *Professor Martin Charter, Director, The Centre for Sustainable Design, University for the Creative Arts, UCA Farnham UK*

‘Robin has taught and researched consumer product innovation and sustainable design for many years. We have to thank him for producing this timely book that gives all of us access to a great archive of information set within a framework that challenges contemporary design practice.’ - *Professor Tom Inns, Director, Glasgow School of Art, UK*

‘There is no one better qualified to write on consumer product innovation and sustainable design than Robin Roy. His background in design analysis and theory developed during a long and distinguished career at the Open University has enabled him to bring an authoritative perspective to the area. Indeed his clear and accessible style makes this a work which is both comprehensible and useful. He covers the innovation and evolution of representative range of products from vacuum cleaners to

mobile phones. The context for their development includes the involvement of legislation and environmental issues, so that the social impact they have had can be understood. There are both successes and failures which enable him to draw conclusions and to provide guidelines for designing, engineering and marketing new products, which most importantly will be environmentally sustainable. This book is essential reading for not only design students but for all those interested in sustainable product innovation.' - *Michael Tovey, Professor of Industrial Design, Coventry University, UK*

About the Author

Robin Roy is Emeritus Professor of Design and Environment at the Open University. Since joining the OU in 1971 as one of the first lecturers in Design, he has chaired and contributed to many OU courses on design, innovation, energy and environment, most recently *Design Essentials; Innovation: Designing for change; and Environment: Journeys through a changing world*. In 1979, he founded the Design Innovation Group to research design and innovation management and sustainable design. He has published many books, book chapters, papers and articles on topics ranging from design creativity and the successful management of new product development to environmentally sustainable education systems and consumer adoption of low and zero carbon technologies. He is a Fellow and Council member of the Design Research Society, a former Director of Carbon Connections Ltd. and a Trustee of Powerful Information, a local international development charity.

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