

## **CONSUMER PRODUCT INNOVATION AND SUSTAINABLE DESIGN.**

### *The evolution and impacts of successful products*

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### **Chapter 1 Patterns of innovation**

This chapter introduces the book's inspiration from the British consumer magazine, *Which?* 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 designers, developers and innovators**

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

- Designing for Product Success (e.g. the need for genuine innovation)
- Designing for the environment (e.g. different approaches from single issue green design to sustainable systems innovation)
- Taking social influences and impacts into account
- Designing for the future (e.g. smart consumer products)