Chapter 5
Future Sustainability, Innovation and Marketing: A Framework for Understanding Impediments to Sustainable Innovation Adoption and Corporate Social Responsibility

Steven J. Greenland

Abstract Sustainable innovations and socially responsible marketing practices are critical for future sustainability. This chapter presents a case study analysis of three research projects that, in conjunction with observations of contemporary business and marketing practice trends, draws out key perspectives on impediments to innovation adoption and future sustainability. Poor government and regulatory policies, as well as irresponsible business activities, are highlighted as significant hindrances to environmentally and socially responsible behaviours. A framework summarising the different impediments to sustainable innovation adoption is subsequently presented, which includes the radicalness of the innovation, internal and external barriers, unintended negative consequences, as well as unsustainable and irresponsible marketing practices. By highlighting these elements, the framework will help researchers to identify ways to speed up rates of sustainable innovation adoption. The feasibility of future sustainability is also discussed, with potential solutions to key global social and environmental challenges presented. While the relevant case studies relate to three different sectors in Australia, the findings, framework and subsequent recommendations should be relevant to a much wider range of innovation and sustainability contexts.

Keywords Barriers to innovation · Sustainability case study · Sustainable innovation · Corporate irresponsibility · Innovation adoption model

5.1 Introduction

Many major global environmental and social challenges are due to human activity. A rather bleak illustration of this is the ongoing major extinction event caused by

S. J. Greenland (✉)
Charles Darwin University, Darwin, Australia
e-mail: steven.greenland@cdu.edu.au

D. Crowther and S. Seifi (eds.), *The Components of Sustainable Development*,
Approaches to Global Sustainability, Markets, and Governance,
https://doi.org/10.1007/978-981-13-9209-2_5

climate change (Warren et al. 2018). Darwin's (1859) evolutionary theory of natural selection appears to be progressing at an accelerated rate—one in five species are currently facing extinction, which is set to rise to 50% by the end of the twenty-first century (Grooten and Almond 2018). Reducing the negative impact of human activity is therefore essential for future sustainability.

This chapter begins by discussing sustainability and acknowledging tertiary education as a key determinant of socially responsible and sustainable consumption. It then describes the main sustainability challenges facing the planet and highlights the need for effective strategies to create appropriate balance between the three pillars of future sustainability—the economy, environment and society (Hansmann et al. 2012).

The central part of this chapter explains the significance of sustainable technology innovation for future sustainability. As with Darwin's theories that were published in 1859 but only became widely accepted 70 years later (Largent 2009), sustainable innovations face many impediments that delay or prevent their adoption and their consequent positive influence. Three research case studies that focus on education, agriculture and tobacco have been used to illustrate different impediments to sustainable innovation adoption. A framework summarising these is presented, which should help researchers and practitioners interested in speeding up sustainable innovation adoption rates.

The final part of this chapter focuses on the darker sides of contemporary business and marketing activity, which have proven pervasive hindrances to sustainable development and socially responsible behaviour. It then concludes by appraising the feasibility of future sustainability and discussing possible solutions to help move in a more sustainable direction.

Throughout this chapter, the reader is encouraged to reflect on whether future sustainability is desirable and feasible, and to consider potential solutions to global sustainability challenges.

5.2 Future Sustainability

There is an urgent need to reduce the negative effects of human activity (United Nations Environment Programme 2015) and to encourage more sustainable attitudes and behaviours.

Considerable research has sought to understand social and environmental responsibility for a sustainable future. Tertiary education has continually proven to be the key determinant of sustainable attitudes and behaviours (Nguyen et al. 2019—forthcoming). It is therefore relevant to emphasise the significance of education at the start of this chapter, followed by making relevant recommendations for education and future sustainability in the conclusion.

In addition to tertiary education, future sustainability is dependent on a balance or equilibrium between economic, environmental and societal interests (Hansmann et al. 2012). Given this multidisciplinary situation, practitioners and academics should

work together, rather than in silos, to effectively address future sustainability challenges.

5.2.1 Economic Challenges

Global economic development over the past 100 years is responsible for many of the most pressing sustainability challenges. For example, the exploitation of the environment for raw materials and energy production has wrought serious environmental and societal impacts. In spite of sustainability initiatives such as the Paris Agreement to combat climate change (United Nations Climate Change 2018), greenhouse gas (GHG) emissions are increasing at an unprecedented rate (World Meteorological Organization 2017). Australia remains one of the leading per capita CO_2 producers, despite declines in 2009 from a carbon tax intervention that was subsequently removed in 2010, largely due to pressure from the mining industry (Linden 2012).

A prerequisite for future sustainability is businesses placing more importance on environmental and societal goals, rather than just their sales and profit targets (Mitchell et al. 2017). Such profit-driven business culture is the most significant cause of unsustainable outcomes; yet despite extensive discussion in the literature, little has been achieved in terms of changing or ameliorating this. Shareholders demand double-digit returns on their investments, translating into double-digit financial growth targets for multinational business managers, whose annual bonuses and career prospects are dependent on achieving these. Such targets are often realised via production cost cutting (more sustainable practices often add to production costs, so are routinely dismissed), and by promoting the consumption culture where consumers consume more and buy things that they do not need. In conjunction with the consumer's desire for convenience, such activity is escalating public ill health, as well as driving pollution and unsustainable waste production.

5.2.2 Environmental Challenges

While pollution of the land and oceans, and challenges associated with waste management are massive environmental problems, it is climate change driven by GHG emissions that is recognised as the most urgent sustainability issue (United Nations Environment Programme 2015). A recent report by the Intergovernmental Planet on Climate Change (2018) stated the world has a 12-year window for reducing GHG emissions, before a tipping point is reached from which there is no return.

Combatting climate change by reducing GHG emissions is therefore another critical objective for future sustainability (Nguyen et al. 2017). Climate change is causing environmental problems such as sea level and temperature rises for many countries. Increasing drought frequency and severity is hindering agricultural output (O'Mahony et al. 2016); with the United Nations forecasting that water and food

insecurity will become the leading cause of conflict (CDP 2016). Australia provides a strong illustration of such climate challenges, with its agricultural sector experiencing the worst droughts in over 400 years (Freund et al. 2017).

5.2.3 *Societal Challenges*

Sustainability challenges are also being driven by rapid population growth in emerging markets. The global population is predicted to increase from 7.5 billion in 2020 to 9.8 billion by 2050 (United Nations Department of Economic and Social Affairs 2017), which could be higher if China further relaxes its controversial one and two child policies (e.g. Gietel-Basten 2018). A 25% population increase means global sustainability challenges will only further escalate, particularly in emerging markets, given their limited public health and environmental regulations (Greenland et al. 2016).

Another societal sustainability challenge relates to poor lifestyle and consumption choices, which are responsible for the non-communicable disease (NCD) epidemic. NCDs are the world's biggest cause of chronic ill health and death, mainly through cardiovascular disease, cancer, chronic respiratory disease and diabetes (Moodie et al. 2013). The marketing of harmful products, which increases consumption, is a major cause of NCDs, including rapidly rising obesity rates that many countries are experiencing (Comans et al. 2013). Most manufacturers of harmful products such as tobacco, alcohol and junk foods high in salt and sugar use marketing tactics, including bulk-buy discounts, with the sole aim of increasing consumption rates. Table 5.1 presents the prices associated with a selection of these products in one of Australia's major grocery retailers.

As Table 5.1 shows, smaller bottles of carbonated soft drink are up to six times more expensive than larger sizes based on volume. Single bottles of beer are double the price of bottles in cases of 24, which increases to two and half times if the '20% off beer if you buy two cases' promotion is also applied. Similar bulk-buy discounts are common for confectionery and other snack items. Consumers are consequently being conditioned to buy more. They are punished for purchasing smaller sizes, which carry the highest per volume prices, while being rewarded for purchasing

Table 5.1 Examples of harmful product prices

Stock-keeping unit	Solo-carbonated soft drink	Coopers original pale ale	Cadbury's dairy milk	Thins potato chips
Smallest pack size available	$6.00/litre	$11.47/litre	$3.00/100 g	$3.33/100 g
Largest pack size available	$1.00/litre	$5.56/litre	$1.43/100 g	$0.91/100 g

Based on a Woolworths supermarket retail audit, September 2018

larger sizes. Such marketing practices are common across many product categories, with pack optimisation research (Wansink 1996) showing that consumers that make larger purchases end up consuming more.

As a society we need to ask ourselves whether these marketing tactics are acceptable for products like tobacco, alcohol, soft drinks and junk food, which are not only harmful, but also addictive and escalate the NCD epidemic. Tougher global regulations on such marketing practices are required to protect public health.

Furthermore, escalating energy and product consumption rates are strongest in emerging markets, which also have the highest birth rates and the least amount of regulations. The profit-oriented business culture is consequently having maximum impact in these countries. For example, in its recent annual report British American Tobacco (BAT) described Indonesia, the world's fourth most populous country with minimal tobacco marketing regulations, as a growth engine market (Greenland 2012). Similarly China, the world's most populous country with similarly weak regulations, has among the highest rates of smoking. The NCD epidemic is a ticking time bomb yet to explode in many emerging markets and is therefore another major consideration for future sustainability initiatives.

5.3 Sustainable Innovation

Along with tertiary education, innovation is integral to future sustainability (Cancino et al. 2018). Sustainable innovations encompass products, processes, ideas and behaviours that have positive social and environmental outcomes.

Innovation occurs along a continuum with smaller incremental improvements at one end and more radical ones at the other. For example, most sustainable household appliances are ongoing minor incremental improvements to existing products in terms of energy efficiency—while the product's appearance and functionality do not change, it makes a sustainable contribution by reducing GHG emissions. More radical sustainable innovations include new products like Australia's Naturally Cheeky's (naturallycheeky.com.au) unpasteurised fresh juice product that uses apple cider vinegar as a natural preservative. When mixed with sparkling water it provides a healthy alternative to highly processed, sugar-filled carbonated soft drinks, which helps to combat the NCD epidemic. This juice product radically differs from other drinks on the market, which means both consumers and retailers require education about it.

In terms of processes addressing sustainability challenges, climate-smart agricultural innovation is crucial for overcoming climate change that is causing drought severity and frequency, and to satisfy global population growth by increasing food productivity. As changing agricultural processes often entails a major shift in farming practices as well as government policy, such innovation is deemed to be more radical in nature.

Three-dimensional (3D) metal printing is another even more radical process innovation with the potential to revolutionise metal manufacturing. By its very nature,

3D printing is more sustainable in terms of materials used and corresponding waste minimisation. It also greatly enhances production efficiencies and reduces costs. For example, SPEE3D (spee3d.com) is one of the world's first commercial, mobile 3D metal printers that allows durable replacement parts to be built on site, removing the time lag associated with supply chain logistics and delivering huge savings through fast-parts production, as well as faster repairs and significantly reduced downtime. More extreme radical innovations like this have been defined as disruptive innovations, given their potential to disrupt and displace established products and practices (Christensen et al. 2015).

The above examples show that many global sustainability challenges can be addressed using innovations that already exist. So it is questionable on why many of these have yet not been adopted and the corresponding sustainability challenges ameliorated? Thus, an important future sustainability challenge is to speed up the adoption of sustainable innovation.

5.4 Case Study Analysis

The following case studies reveal a diversity of impediments to sustainable innovation adoption.

5.4.1 Case 1—Innovation in Tertiary Education

Education, tertiary in particular, is recognised as a key determinant of sustainable attitudes and behaviours (Nguyen et al. 2019—forthcoming). The importance of making tertiary education more widely available for future sustainability cannot be overstated. Online education is a significant learning innovation that has done just that, by making tertiary education accessible to those in full-time employment and full-time carers, as well as those living remotely. Over the past decade, the number of online students has grown phenomenally. For example, Swinburne University of Technology teaching programs for Open Universities Australia experienced an exponential growth in online students between 2007 and 2012 (Greenland and Moore 2014), with 68% of these over 30 years old (Open Universities Australia 2016).

Online education not only creates more socially responsible behaviour, but also enables workers to upskill to satisfy the business demand for trained employees. Online education is also more sustainable in terms of less energy being used in relation to travel and the provision of classrooms. However, online education has also created some unintended consequences, including significantly higher dropout rates compared to their on-campus counterparts (Maathuis-Smith et al. 2011).

A recent qualitative study investigated reasons for online student dropouts in Australia (Moore and Greenland 2017) and discovered that employment was the main factor, as cited by more than one-third of the students interviewed (see Fig. 5.1),

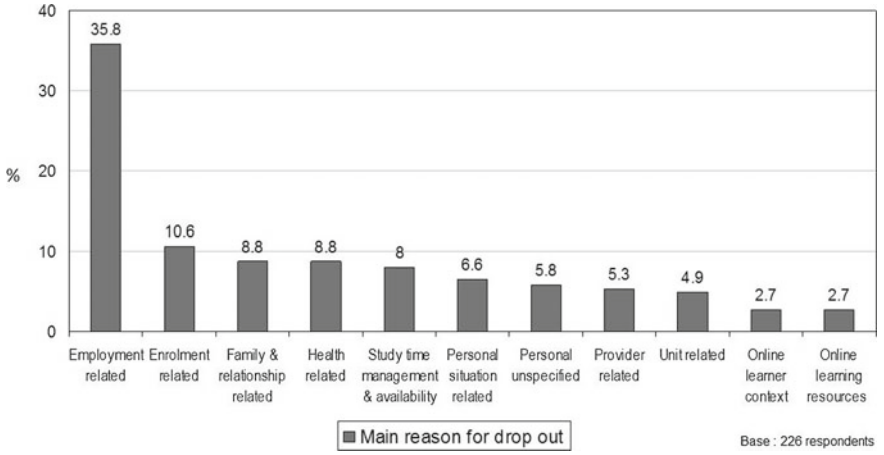

Fig. 5.1 Main dropout reasons among Australian online undergraduate students (Moore and Greenland 2017)

followed by personal factors. Ironically, but perhaps not surprisingly, it was the very nature of non-traditional students that caused their dropouts, namely the fact they are older, often working and have greater responsibilities compared to traditional students. This study also found that universities had not adapted their policies and procedures to accommodate online students.

A more serious unintended consequence of the online student dropout rates was due to a revision to the Australian Government's university funding policy. That is student degree completion rates are now being used in Australia as a pseudo-teaching quality indicator to determine the level of funding given to universities (Moore and Greenland 2017). Thus, since online degree courses automatically experience higher dropout rates, universities engaged in online education are being penalised. This unintended consequence has major repercussions for future sustainability, as tertiary educators considering entering the online space may decide not to do so, and those already within it may be evaluating its viability. This unintended consequence therefore has the potential to significantly reduce the positive sustainability impact of the online education innovation.

5.4.2 Case 2—Innovation in Agriculture

More effective agricultural water management is essential for future sustainability. Agriculture is the largest commercial consumer of water, accounting for 70% of consumption (United Nations World Water Assessment Programme 2016). With ongoing climate change and increasing drought frequency, as well as the rapidly growing global population, water is likely to become a key security issue in the

future (CDP 2016). By 2050, without improvement to current agricultural practices, it has been estimated that the volume of water evaporated during crop production will almost double (Comprehensive Assessment of Water Management in Agriculture 2007).

Drip irrigation uses dripper lines at or below the plant root level and is widely regarded as the most water efficient form of irrigation. The clear sustainability benefits have made the World Health Organization (2016) determine it as a significant agricultural innovation, particularly critical where water supplies are limited. Israel is the 'poster child' for drip irrigation where its use has enabled agricultural output to increase tenfold while water consumption has remained the same (Dobbs et al. 2011).

As another largely arid country, and even though some drought evaluation systems classify Australia as not severely impacted by water challenges (e.g. Frenken and Gillet 2012), the country has encountered well-publicised, extreme droughts over the past few years. Its water challenges are aptly illustrated by the multibillion-dollar desalination plants serving Melbourne, Sydney and Brisbane (El Saliby et al. 2009). While drip irrigation is not suitable for all crops and environmental conditions, this innovation is not used as extensively as it could be in Australia, with flood irrigation remaining the most common agricultural method.

A recent Australian study by Greenland et al. (2018) investigated reasons why more farmers do not use drip irrigation, via 40 depth interviews with agricultural stakeholders and a survey of 148 farmers. The results showed that while farmers recognise drip irrigation as the most water efficient method, water efficiency was not their main selection criterion. This study also revealed numerous interrelated barriers to adopting drip irrigation (see Fig. 5.2).

As shown in Fig. 5.2, internal barriers included the financial resources required for installing the drip irrigation system, as well as technological familiarity. Many of

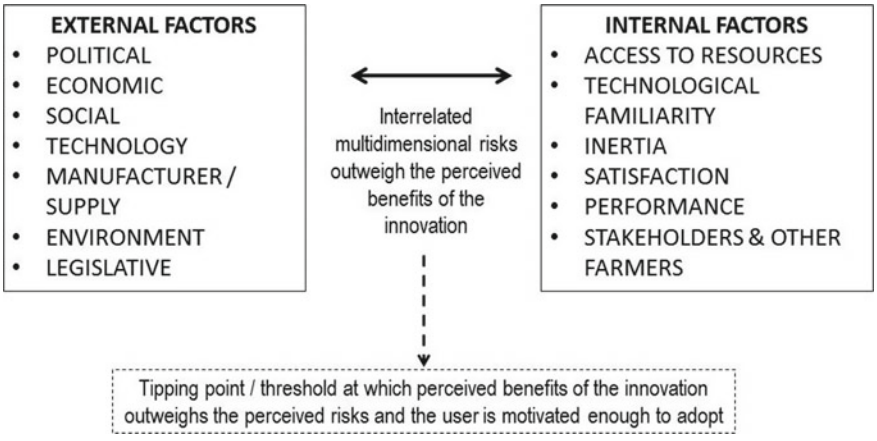

Fig. 5.2 Barriers to sustainable innovation adoption (Greenland et al. 2018)

the farmers that used an alternative irrigation method also used drip to a lesser extent on part of their property, or have used it in the past. For these farmers, a switch to drip irrigation represented incremental innovation, compared to more radical innovation for those with no prior experience of it. Inertia, or lacking motivation to change, along with being satisfied with the current method's performance were also primary internal barriers to drip irrigation adoption.

External barriers to adopting drip irrigation included the environmental conditions that determine the suitability of the innovation, as well as a host of economic, social and technological aspects. Although the most revealing external barrier related to government policies supporting the use of alternative irrigation methods—most federal and state government irrigation initiatives involved investment in water delivery systems (i.e. getting water to the farm, typically via open channels), rather than its efficient application to crops. Such policies also include rewards for capturing water that runs off the land after application, rather than rewarding farmers for using less water in the first place.

The popularity and widespread use of less water efficient flood irrigation, including widely available support and equipment, have reinforced farmers' continuance of this method. The barriers shown in Fig. 5.2 are all interrelated, and for many farmers the perceived risks of changing to drip irrigation outweighed the perceived benefits.

This case study shows the role barriers have in the adoption of sustainable technology. Increasing the use of drip irrigation in Australia represents a major reform, involving changes to government policy and the agricultural sector's view towards irrigation. Thus, drip irrigation represents a disruptive technology, with any widespread adoption displacing established practices and policies.

5.4.3 Case 3—Innovation in Regulation

The third research case study involves innovative tobacco regulation, which seeks to combat the NCD epidemic, as well as the socially irresponsible tobacco industry response. Australia has some of the toughest tobacco regulations in the world and is regarded by the industry as a 'dark' market (Greenland 2015). While 'Big Tobacco' consistently denies the impact of regulation on the incidence of smoking, the relationship between regulation and smoking rates is clear, as illustrated in Fig. 5.3.

Public health campaigners have advocated plain tobacco packaging since the 1980s, and yet it took more than 30 years for Australia to become the first country to successfully implement such legislation after overcoming fierce industry opposition, including a public campaign telling consumers that 'plain packaging makes no sense' (Greenland 2012). While smoking rates in Australia have fallen to an all-time low, the industry continues to deny the logic of plain packaging and strongly resists its implementation in other countries.

Australia introduced plain packaging in 2012 along with the first of a series of substantial annual tax excise increases. However, the tobacco industry is well known for

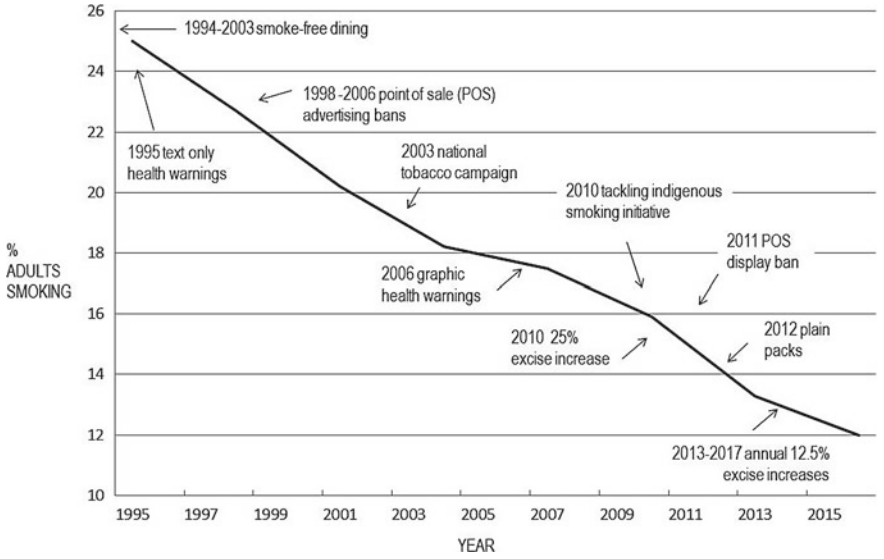

Fig. 5.3 Impact of tobacco regulations on adult smokers in Australia (Greenland 2016)

Table 5.2 Number of cigarette brand colour variants before and after introduction of plain packaging in Australia

	2012	2013	2014	2015
Variant names with colour (*n*)	81	120	113	111
Variant names with colour (%)	47	65	73	76

After Greenland (2016), Greenland et al. (2016)

responding to regulation with marketing activities that thwart its impact. Greenland (2016) therefore investigated the industry response to regulation via the brand strategy of Australia's three main tobacco manufacturers before and after plain packaging was regulated.

Following its introduction, there was a substantial increase in the use of colour brand variant names (see Table 5.2). For example, Dunhill Infinite changed to Dunhill Infinite White, and Dunhill Distinct to Dunhill Distinct Blue.

While this might appear a minor marketing response, it has some sinister underpinnings based on the long-standing myth of healthier cigarette options. Back in the 1970s, medical practitioners started recommending low-tar options, and the industry responded by introducing 'light' and 'mild' cigarette variants. Smokers were led to believe these were less harmful than the stronger 'original' brands. Yet the US Surgeon General subsequently reported that the filter ventilation associated with the 'less harmful' variants encourages smokers to suck harder on the cigarette, thus drawing the smoke deeper into the lungs, which results in deeper cancers.

In the 1980s, the uses of terms like 'mild' and 'light' and 'ultra-light' were banned in many countries in an attempt to end the healthier cigarette myth. The industry responded by using package colouring to signify the tobacco strength, with darker

colours like red and black representing stronger, full flavour brand variants, paler colours like blue representing mild and light variants, and white, yellow, silver as the ultralight options. The subsequent use of colour brand variant names in Australia after plain packaging was introduced is an adaptation of the same strategy to perpetuate the healthier cigarette myth.

Furthermore, to offset the tax excise price increases that were also introduced in Australia after plain packaging, the industry started offering twin-pack sales discounts of around 10% for buying two packs. Some manufacturers also repositioned their brands by cutting prices, such as the BAT Rothmans brand which was reduced by 30% (Greenland 2016).

It is clear that the tobacco industry has responded to Australia's innovative tobacco regulation with its own equally innovative but unsustainable and socially irresponsible marketing tactics. These have been used in an attempt to overcome two of the main reasons people choose not to smoke—perceived health risks and the expense associated with this habit.

5.5 Sustainable Innovation Adoption Model

The three case studies discussed in this chapter highlight different dimensions that negatively affect the adoption of sustainable innovations. The model presented in Fig. 5.4 summarises these impediments. In summary, the online education research

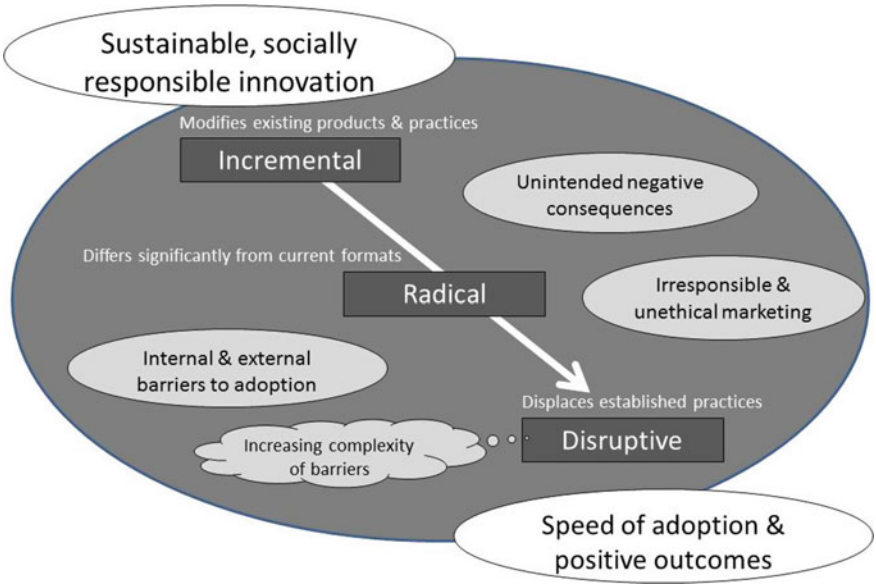

Fig. 5.4 Sustainable innovation adoption model (Based on the case study analysis)

highlighted the unintended consequences of innovation, which can slow down adoption and may deter uptake altogether. The drip irrigation research illustrated the many interrelated internal and external barriers to adoption, which increase in complexity the more radical the innovation. Minor incremental innovations may still take some time to be adopted, but the rate of adoption is slower for more radical innovation, especially for disruptive innovations like drip irrigation where reform to government funding and agricultural policy is required. The research examining the tobacco industry's innovative response to innovative regulation illustrates the effect of irresponsible marketing on positive sustainability outcomes such as reducing the NCD epidemic.

The model presented in Fig. 5.4 should help researchers consider the impediments to sustainable innovation. By identifying and understanding these factors, it should be possible to accelerate the innovation adoption process and thereby speed up the positive sustainability outcomes.

5.6 Irresponsible Marketing

This last part of the chapter discusses the proliferation of irresponsible marketing practices. Table 5.3 shows how global expenditure on market research has more than tripled over the past 20 years, partly driven by internationalisation and the increase in multinational revenue derived from emerging markets. This focus on emerging markets presents future sustainability concerns because of their rapidly growing populations and limited regulations, which enable companies to operate with minimal regard to both environmental and social impacts, or indeed within acceptable ethical boundaries (e.g. Rome 2017).

In particular, the marketing of harmful products in emerging markets like Indonesia also appears to be influencing the dramatic rise in NCDs in these countries. Furthermore, the tobacco industry has perfected the use of the different marketing mix elements, including price, packaging, promotion and branding in highly regulated developed countries like Australia, which are then used to full effect in less regulated, emerging markets.

This growth in global market research has also been driven by increasing expenditure on collecting and analysing big data, particularly from social media sources.

Table 5.3 Annual turnover of the global market research industry since 2001 (ESOMAR 2002, 2014, 2017)

Year of turnover	USD $B
2001	17.8
2013	62.6[a]
2016	67.9[a]

[a]Includes big data and analytics

For more than 10 years, companies like Mindset Media have been investigating the marketing potential of understanding consumers' online behaviour, using psychographics to segment online users according to personality type (PR Newswire 2010). Personality has long been recognised as offering great potential as a segmentation variable—if you understand a media consumer's personality, it is clearer what communications are required to 'push the right buttons' to influence attitudes and behaviours.

The ability to use personality and psychographics for large-scale marketing initiatives is a recent innovation facilitated by social media and showcases the increasing levels of marketing sophistication. Marketers have become progressively more active in this regard, although the influencing of social media users has generated most publicity in the political arena. For example, marginal election victories including Trump in the 2016 US presidential election and the Brexit vote in the UK have been scrutinised for using psychographic social media micro-segmentation and targeting techniques (e.g. Gilligan 2017; Ward 2018). Such political results can negatively impact on future sustainability initiatives, particularly in relation to carbon emissions and climate change, as well as social disharmony via increasing nationalistic sentiments and the weakening of public health care (e.g. Corbett 2016; Goldstein and Greenberg 2018).

Businesses are also increasingly using psychographics for advertising and public relations initiatives to garner public support for corporate interests and opposition to policies that promote sustainability and public health. For example, Australia's mining industry holds strong political sway and has clearly influenced political leadership challenges, including the end of Kevin Rudd's prime ministership which was precipitated by its oppose mining tax campaign (Linden 2012). The Australian Government in response to industry opposition and its manipulation of public opinion also removed its carbon tax, which was having a positive impact on GHG emissions. These are now at record level highs in Australia (Jericho 2018), and the latest government energy policies are in support of brown coal power stations and fracking, moving further away from a sustainable future.

5.7 Conclusion

Charles Darwin would be fascinated by the sustainability challenges of the modern world. The ongoing, unprecedented human-made major extinction event validates his theories in relation to extinction and natural selection (Darwin 1859), which took 70 years to become widely accepted and are even more pertinent today. 'Survival of the fittest' dictates that many less affluent nations and segments of society, without the resources to ameliorate or respond to the detrimental environmental and social impacts of human activity, will suffer and decline.

If future generations are to live without economic, social and environmental hardship, action is required now, not in another 70 years. As global population increases and climate change accelerates, without appropriate response to address the numer-

ous detrimental effects of human activity, sustainability challenges will become even more acute.

Future sustainability is feasible, but requires the resources and determination necessary for creating equilibrium between economics, the environment and society. It is also dependent upon people, businesses and governments all taking greater responsibility for the problems they cause.

Solutions to many global sustainability challenges already exist in the form of sustainable innovations. Yet as revealed by the case studies examined here, such innovations often face an array of impediments that either reduce the speed of adoption or prevent them from being adopted at all. The model presented in this chapter summarises such impediments, including radicalness of the innovation, internal and external barriers to adoption, unintended negative consequences, as well as unsustainable and irresponsible marketing responses. Further research to understand and overcome impediments is essential in order to speed up sustainable innovation adoption rates.

The case study analysis also highlighted the significance of sustainable government initiatives, including appropriate regulation, as a key driver of positive environmental and social outcomes. Since companies and industries are unable to effectively self-regulate (Jones et al. 2012), governments must take the responsibility for guiding industries, as well as making them accountable when they behave unethically and irresponsibly.

A sustainable future requires businesses to strive for environmental and social goals, not just their financial targets. Yet most multinationals and their executives remain driven by financial goals and are operating with impunity around social and environmental obligations. Consequently, the world is moving in an increasingly unsustainable direction.

It would appear that the influence of multinationals, in conjunction with increasingly sophisticated marketing practices for influencing consumer opinion, prevents future sustainability-oriented policies from being implemented and protects these businesses from being held accountable for their actions.

With revenues that often exceed the gross domestic product GDP of many countries, including substantial developed markets (Green 2016), many multinationals exert immense political sway and dictate government policy that favours their profit motives. For example, oil and gas companies like Exxon Mobil, BP and Shell exceed the GDP of 175 countries. This provides a clearer perspective on their resistance to the phasing out of fossil fuels and their lack of investment in renewable energy sources. It also highlights this industry's blatant disregard for responsible and ethical behaviour, which includes a long history of bribery and corruption (Lyall 2018), as well as a lack of accountability for causing ongoing environmental pollution, including GHG emissions.

The tobacco industry case study provides another clear example of unethical corporate practice, particularly as tobacco is the key driver of the global NCD epidemic. While public health campaigners in developed countries applaud their regulatory successes like plain packaging in Australia, and talk about the tobacco 'end game' (e.g. Henningfield 2014), the reality in many emerging markets is starkly different. An

unintended consequence of such regulation in Western countries has been cultivation of the tobacco industry's expertise in using the remaining, unregulated elements of the marketing mix. This full complement is then used to maximum effect in emerging markets like Indonesia which has little regulation and where 65% of males aged 15 or over smoke daily (World Health Organization 2017).

To help offset the impact of unsustainable marketing practices education, tertiary education in particular, has proven a key determinant of sustainable attitudes and behaviours. Universities play a vital role in shaping future sustainability. Thus, more clearly defined sustainability strategies by universities, which promote sustainable attitudes and behaviours in consumers, businesses and governments, are needed to optimise their positive impact. This need is greater than ever before, given marketing's increasing sophistication and potential to influence political and consumer opinion, not least by companies hoodwinking them into dismissing the need for sustainability initiatives and by promoting unsustainable alternatives. Universities must take up the mantle of citizen, industry and government watchdog and actively promote more ethical, social and environmental responsibility. This could be achieved through the following:

- More clearly defined strategies for sustainability education dissemination, including:
  - core degree units/courses in sustainability
  - sustainability communication initiatives via public lectures involving local schools and businesses, as well as alumni.
- Promoting and supporting sustainability-focused research initiatives, including:
  - advancing innovative sustainability technology
  - identifying how to overcome the barriers to innovation adoption
  - evaluating and exposing unsustainable and irresponsible business practices.
- Leading by example and not accepting sponsorship from organisations that engage in unsustainable activities, while supporting sustainable organisations and politicians.

References

Cancino, C. A., La Paz, A. I., Ramaprasad, A., & Syn, T. (2018). Technological innovation for sustainable growth: An ontological perspective. *Journal of Cleaner Production, 179,* 31–41.

CDP. (2016). *Thirsty business: Why water is vital to climate action*. 2016 Annual Report of Corporate Water Disclosure, viewed March 6, 2018. https://www.cdp.net/en/research/global-reports/global-water-report-2016.

Christensen, C. M., Raynor, M. E., & McDonald, R. (2015). What is disruptive innovation? *Harvard Business Review, 93*(12), 44–53.

Comans, T., Whitty, J., Hills, A., Kendall, E., Turkstra, E., Gordon, L., et al. (2013). The cost-effectiveness and consumer acceptability of taxation strategies to reduce rates of overweight and obesity among children in Australia: Study protocol. *BMC Public Health, 13*(1), 1182.

Comprehensive Assessment of Water Management in Agriculture. (2007). *Water for food, water for life: A comprehensive assessment of water management in agriculture*. London: Earthscan, and Colombo: International Water Management Institute.

Corbett, S. (2016). The social consequences of Brexit for the UK and Europe: Euroscepticism, populism, nationalism, and societal division. *International Journal of Social Quality, 6*(1), 11–31.

Darwin, C. (1859). *On the origin of species, by means of natural selection, or the preservation of favoured races in the struggle for life*. J. Murray, London Print, viewed November 22, 2018. http://darwin-online.org.uk/converted/pdf/1861_OriginNY_F382.pdf.

Dobbs, R., Oppenheim, J., Thompson, F., & Zornes, M. (2011). *Resource revolution: Meeting the world's energy, materials, food and water needs*. McKinsey Global Institute, viewed December 3, 2018. www.mckinsey.com/insights/energy_resources_materials/resource_revolution.

El Saliby, I., Okour, Y., Shon, H. K., Kandasamy, J., & Kim, I. S. (2009). Desalination plants in Australia, review and facts. *Desalination, 247,* 1–14.

ESOMAR. (2002). *Global market research industry report*. The Netherlands: ESOMAR Amsterdam.

ESOMAR. (2014). *Global market research industry report*. The Netherlands: ESOMAR Industry Report.

ESOMAR. (2017). *Global market research industry report*. The Netherlands: ESOMAR Amsterdam.

Frenken, K., & Gillet, V. (2012). *Irrigation water requirement and water withdrawal by country*. Food and Agriculture Organization of the United Nations, viewed January 3, 2018. http://www.fao.org/nr/water/aquastat/water_use_agr/IrrigationWaterUse.pdf.

Freund, M., Henley, B. J., Karoly, D. J., Allen, K. J., & Baker, P. J. (2017). Multi-century cool- and warm-season rainfall reconstructions for Australia's major climatic regions. *Climate of the Past, 13,* 1751–1770.

Gietel-Basten, S. (2018). China looks to relax two-child policy—but it won't solve demographic problems. The Conversation, viewed November 22, 2018. https://theconversation.com/china-looks-to-relax-two-child-policy-but-it-wont-solve-demographic-problems-102518.

Gilligan, A. (2017). Revealed: How Russia invaded the heart of British power; The Kremlin's manipulation of the American election began with Brexit. Andrew Gilligan unravels the connections between Team Trump, the referendum vote and Moscow', *Sunday Times*, 5 November, p. 10.

Goldstein, B. D., & Greenberg, M. R. (2018). Global climate change and the "so what?" issue: Reversing the impact of Donald Trump. *American Journal of Public Health, 108,* S78–S79.

Green, D. (2016). *The world's top 100 economies: 31 countries; 69 corporations*. The World Bank Blog, viewed November 30, 2018. https://blogs.worldbank.org/publicsphere/world-s-top-100-economies-31-countries-69-corporations.

Greenland, S. (2012). Does plain packaging spell death for cigarette brands in Australia and beyond? In S. Greenland, J. Bainbridge, C. Galloway, & R. Gill (Eds.), *Strategic communication: Cases in marketing, public relations, advertising and media* (pp. 2–13). Australia: Pearson.

Greenland, S. J. (2015). Cigarette brand variant portfolio strategy and the use of colour in a darkening market. *Tobacco Control, 24*(e1), e65–e71.

Greenland, S. J. (2016). The Australian experience following plain packaging: The impact on tobacco branding, *Addiction, 111*(12), 2248–2258.

Greenland, S. J., Johnson, L. W., & Seifi, S. (2016). Tobacco manufacturer brand strategy following plain packaging in Australia: Implications for social responsibility and policy. *Social Responsibility Journal, 12*(2), 321–334.

Greenland, S. J., Levin, E., Dalrymple, J., & O'Mahony, B. (2018). Sustainable innovation adoption barriers: Water sustainability, food production and drip irrigation in Australia. *Social Responsibility Journal*, viewed December 3, 2018. https://doi.org/10.1108/SRJ-07-2018-0181.

Greenland, S. J., & Moore, C. (2014). Patterns of online student enrolment and attrition in Australian open access marketing education: A preliminary case study. *Open Praxis, 6*(1), 45–54.

Grooten, M., & Almond, R. E. A. (2018). *World wildlife fund. Living planet report—2018: Aiming higher*. Gland, Switzerland: World Wildlife Fund.

Hansmann, R., Mieg, H., & Frischknecht, P. (2012). Principal sustainability components: Empirical analysis of synergies between the three pillars of sustainability. *International Journal of Sustainable Development and World Ecology, 19*(5), 451–459.

Henningfield, J. E. (2014). The tobacco endgame: It's all about behavior. *Preventive Medicine, 68,* 11–16.

Intergovernmental Panel on Climate Change. (2018). *Global warming of 1.5 °C summary for policy makers*, viewed November 22, 2018. http://www.ipcc.ch/report/sr15/.

Jericho, G. (2018). Australia's emissions are rising. It's time for this government to quit pretending. *The Guardian*, January 9, viewed November 22, 2018. https://www.theguardian.com/business/grogonomics/2018/jan/09/australias-emissions-are-rising-its-time-for-this-government-to-quick-pretending.

Jones, S. C., Gregory, P., & Kervin, L. (2012). Branded food references in children's magazines: "Advertisements" are the tip of the iceberg. *Journal of Pediatric Obesity, 7*(3), 220–229.

Largent, M. (2009). The so-called eclipse of Darwinism. *Transactions of the American Philosophical Society, 99*(1), 3–21.

Linden. (2012). The mother of all scare campaigns: The role of advertising in the miners' campaign to defeat the resources super profits tax (RSPT). In S. Greenland, J. Bainbridge, C. Galloway, & R. Gill (Eds.), *Strategic communication: Cases in marketing, public relations, advertising and media* (pp. 126–143). Australia: Pearson.

Lyall, A. (2018). A moral economy of oil: Corruption narratives and oil elites in Ecuador. *Culture, Theory and Critique, 59*(4), 380–399.

Maathuis-Smith, S., Wellington, S., Cossham, A., Fields, A., Irvine, J., Welland, S., et al. (2011). Obtaining high retention and completion rates in a New Zealand ODL environment: A case study of strategies employed by information and library studies faculty at the Open Polytechnic. *Journal of Open, Flexible and Distance Learning, 15*(1), 31–45.

Mitchell, C. H., Smith, R. G., Schipanski, M. E., Atwood, L. W., & Mortensen, D. A. (2017). Agriculture in 2050: Recalibrating targets for sustainable intensification. *BioScience, 67*(4), 386–391.

Moodie, R., Stuckler, D., Monteiro, C., Sheron, N., Neal, B., & Thamarangsi, T. (2013). Profits and pandemics: Prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. *Lancet, 381,* 670–677.

Moore, C., & Greenland, S. J. (2017). Employment driven online student attrition and the assessment policy divide: An Australian open access higher education perspective. *Journal of Open, Flexible and Distance Learning, 21*(1), 52–62. (ERA listed).

Nguyen, N., Greenland, S. J., Lobo, A., & Nguyen, H. V. (2019). Demographics of sustainable technology consumption in an emerging market: The significance of education to energy efficient appliance adoption. *Social Responsibility Journal*. (forthcoming).

Nguyen, T. N., Lobo, A., & Greenland, S. J. (2017). 'The influence of Vietnamese consumers' altruistic values on their purchase of energy efficient appliances. *Asia Pacific Journal of Marketing and Logistics, 29*(4), 759–777.

O'Mahony, B., Dalrymple, J., Levin, E., & Greenland, S. J. (2016). The role of information communications technology (ICT) in sustainable water management practise. *International Journal of Sustainable Agricultural Management and Informatics, 2*(1), 79–92.

Open Universities Australia. (2016). *2015 OUA year in review*, viewed November 22, 2018. https://www.open.edu.au/yearinreview2015/.

PR Newswire. (2010). *ClearSaleing and mindset media first to offer integrated advertising analytics and psychographic profiling to advertisers*, August 10, viewed November 22, 2018. http://link.galegroup.com/apps/doc/A234085612/AONE?u=ntu&sid=AONE&xid=23fd7ec0.

Rome, T. K. (2017). Shell to be tried over Nigeria oil "bribery"', *The Times*, December 21, p. 38, viewed November 21, 2018. http://link.galegroup.com/apps/doc/A519766391/AONE?u=ntu&sid=AONE&xid=6773a3ff.

United Nations Climate Change. (2018). 'The Paris Agreement' 18 October, viewed December 7, 2018. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement.

United Nations Department of Economic and Social Affairs. (2017). World population projected to reach 9.8 billion in 2050, and 11.2 billion in 2100, June 21, New York, viewed November 22, 2018. https://www.un.org/development/desa/en/news/population/world-population-prospects-2017.html.

United Nations Environment Programme. (2015). UNEP 2014 annual report, viewed July 19, 2018. https://wedocs.unep.org/bitstream/handle/20.500.11822/9420/-UNEP_2014_Annual_Report-2015UNEP_Annual_Report_2014_Production_LQ.pdf.pdf?sequence=3&isAllowed=y.

United Nations World Water Assessment Programme. (2016). The United Nations world water development report 2016: Water and jobs. UNESCO, Paris, viewed July 19, 2018. http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2016-water-and-jobs/.

Wansink, B. (1996). Can package size accelerate usage volume? *Journal of Marketing, 60*(3), 1–14.

Ward, K. (2018). Social networks, the 2016 US presidential election, and Kantian ethics: Applying the categorical imperative to Cambridge Analytica's behavioral microtargeting. *Journal of Media Ethics, 33*(3), 133–148.

Warren, R., Price, J., VanDerWal, J., Cornelius, S., & Sohl, H. (2018). The implications of the United Nations Paris Agreement on climate change for globally significant biodiversity areas. *Climatic Change, 147*(395), viewed November 30, https://doi.org/10.1007/s10584-018-2158-6.

World Health Organization. (2016). The health and environment lexicon—drip irrigation, viewed November 22, 2018. http://apps.who.int/thelexicon/entry.php.

World Health Organization. (2017). WHO report on the global tobacco epidemic, viewed November 30, 2018. https://www.who.int/tobacco/surveillance/policy/country_profile/idn.pdf.

World Meteorological Organization. (2017). *WMO Greenhouse Gas Bulletin*, no. 13, viewed November 22, 2018. https://library.wmo.int/doc_num.php?explnum_id=4022.