



Unsustainable business models – Recognising and resolving institutionalised social and environmental harm

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ABSTRACT

Academic and business interest in sustainable business models (SBMs) as a potential solution to pressing global sustainability issues has grown significantly over the past decade. Yet, to date sectoral progress on business model innovation has been insufficient to address much of the social and environmental harm caused by, or facilitated by industry, and progress against the UN Sustainable Development Goals (SDGs) has been disappointing. This study investigates the following research question: What are the dominant “unsustainable business model” types per sector that institutionalise social and environmental harm, and hold back progress on the SDGs, and what are the potential sustainable business model responses? This paper first investigates the dominant unsustainable business model types and potential sustainable business model solutions per key sector. Based on this analysis, a comprehensive overview of nine dominant unsustainable business model (UBM) archetypes and potential sustainable business responses are developed. The UBM archetypes are: 1) Environmental resource exploitation and waste; 2) Human resource exploitation and waste; 3) Economic exploitation; 4) Unhealthy or unsustainable offering; 5) Quantity over quality and value; 6) Addictive consumption pattern; 7) Complex opaque global value chain; 8) Short-term shareholder – not stakeholder value and 9) Financing and supporting unsustainable practices. Furthermore, a hierarchy of sustainable business model responses is introduced, showing the need for business to develop multiple initiatives, and a recognition that the focus for SBM innovation should be to some extent sector specific. Finally, directions for future research to transform dominant unsustainable business models are provided.

1. Introduction

Sustainable business models have been positioned as a key enabler for addressing systemic societal and environmental issues in a business context (Stubbs and Cocklin, 2008), and tackling institutionalised unsustainability (Bocken and Geradts, 2020; Ritala et al., 2021). In 2014, a typology of sustainable business model archetypes was developed (Bocken et al., 2014) to bring what were then disparate strands of the literature together to provide a unified understanding of what types of business model might facilitate or deliver more sustainable outcomes for the environment and society, while still delivering economic sustainability. The article has been widely cited within the industrial sustainability community (Lemus-Aguilar et al., 2019; Nosratabadi et al., 2019; Pieroni et al., 2019), and at the same time, there has been a huge growth in interest in business model innovation for sustainability within academia, policymakers, and practitioners (Lüdeke-Freund and Dembek, 2017; Sustainability, 2015).

To date, companies have made notable progress towards addressing grand challenges around climate change, poverty reduction, food security, biodiversity, sustainable consumption and equality, as part of their business models. Awareness of climate change has risen rapidly, and we see that even some of the biggest oil and gas producers have announced plans to radically transform their business models to become carbon-zero by 2050 (e.g., BP, 2020). The offshore wind and solar industries have made huge progress over the past decade in decarbonising the energy supply chain, and the automotive industry, led by Tesla (at the time of writing, the most valuable automotive company in the world; FT, 2020), now seems to be on the cusp of bringing electric transportation to the masses. Within the investment community ESG (Environmental, Social, Governance) funds are gaining increasing attention, and major fund managers are increasingly now pledging to divest entirely of fossil fuel assets (e.g., Norwegian Sovereign Wealth Fund, BlackRock). There has also been a growing interest in tackling the wasteful aspects of a throw-away consumer society, most notably through business models

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based on the circular economy (Lüdeke-Freund et al., 2019). Positive examples are emerging in several sectors to optimise resource use and reduce premature disposal and unnecessary waste (Bocken et al., 2018; Lopez et al., 2019). Examples include retailers offering rental clothing (Little, 2019), department store John Lewis's move into rental of home furnishings (Osborne, 2020), and IKEA's recently announced initiative to buy-back and re-sell used furniture (IKEA, 2020). Multinationals like Unilever and Philips have set ambitious targets to improve the livelihoods, health and sanitation of those living in developing and emerging countries and the 'bottom of the pyramid' (the largest but poorest part of the world population) through their products and services (Geradts et al., 2019). These are very positive steps, some driven by entrepreneurs and industry, some supported by government policy intervention, and others by consumers increasingly demanding alternatives.

However, despite positive examples, there has been insufficient progress in practice to date, exacerbated through the COVID-19 pandemic. The UN's Sustainable Development Goals (SDG) report finds that while there has been some progress against the SDGs, carbon emissions are still rising, and climate change is occurring faster than anticipated; land degradation continues; massive numbers of species are at risk of extinction; there is growing food insecurity and poverty; and unsustainable consumption and production patterns remain pervasive (UN, 2020). This suggests that despite the progress, the majority of industry has yet to make the required transformations to truly embed environmental and social sustainability in the way they do business. For example, circular economy initiatives have gained a lot of attention, but often focus narrowly on recycling (Allwood, 2014). A WBCSD (2018) study exploring innovation for sustainability in large firms across a range of sectors found that while 50% of the firms studied were actively working on process innovations, and 42% on product innovations, only 18% were actively pursuing the potentially more systemic business model innovations. Ritala et al. (2018) based on a content analysis also found that the uptake of sustainable business models by corporations is limited. More comprehensive statistics on sustainability initiatives are not available, but globally the percentages are likely to be even lower than those quoted by WBCSD. Elkington (2020) argues that firms need to go far further than current initiatives such as net-zero and circular economy and aim to deliver meaningful net-positive environmental and social value and introduces the terminology of "regenerative business models" as an aspirational type, whereby industry actively seeks to rectify the environmental (and societal) damage done over the past decades. Ehrenfeld (2019) goes further still, envisaging a world where nature and human flourishing become the objectives of industry, rather than the economy.

Overall, it is disappointing to observe that the sustainable business model archetypes (Bocken et al., 2014) and later examples (e.g., Lüdeke-Freund et al., 2019; Ritala et al., 2018) are still not in widespread use, and even when applied do not seem to be delivering the needed level of transformation (Tukker, 2015). Ritala et al. (2021) observe, unsustainability is embedded, or "institutionalised" within many of the world's conventional business models and our economic systems. Breaking down these institutionalised models is key to successful transformation to a more sustainable system. Cramer (2020) and Jaeger-Erben (2021) observe that successful business model innovation for sustainability and circularity requires a broad network or societal-level focus. There seems to be a need to better understand the unsustainable dimensions of current business models and networks to see which issues sustainable business models currently are, or might, address, and whether there are issues that our current conceptualisations of sustainable business models cannot adequately address. We need to better articulate what "unsustainable business model" archetypes look like, so that consumers, policymakers, industry leaders, entrepreneurs, and the investment community better understand what needs to really be avoided or curtailed. We investigate the following research question: *What are the dominant unsustainable business model types per sector and what are the potential sustainable business model responses?* By unsustainable, we refer

to social and environmental performance, but recognise that from a conventional economic perspective these models may currently be economically sustainable. Such knowledge could enable more appropriate intervention through new regulation and legislation, and drive desire for change in the sector, or at least enable a more pragmatic assessment of the future prospects of these antiquated unsustainable business models.

Next, we explain our method focused on developing a high-level overview by industry sector of the dominant (unsustainable) business models and potential sustainable business model responses. In the discussion, we present an overview of unsustainable business model archetypes, and a hierarchy of potential sustainable business model responses. Finally, we conclude with directions for future research and practice to transform dominant unsustainable business models.

2. Method

This study started with the concept of sustainable business model archetypes by Bocken et al. (2014) (further developed by Ritala et al., 2018), which in a review by Pieroni et al. (2019), were found to be the most cited sustainable business model typology. These original archetypes were developed through a broad review of the literature and a comprehensive coding exercise to identify common traits and develop a categorisation of dominant archetypes.

First, based on the sustainable business model archetypes, we highlight the activities and business structures that often form the basis of unsustainable business models by mapping the issues that each of the sustainable business models seeks to address. By unsustainable, we specifically mean unsustainable for the environment through waste, pollution, climate change and biodiversity loss; and, or unsustainable for society through promoting inequalities, exploitation, and undermining health, safety, and wellbeing; but, not necessarily unsustainable economically, at least in the short-term. The premise of this work is that in the longer-term, business that is unsustainable for the environment and society will increasingly become unsustainable economically too.

Second, through a review of the academic literature, reports and popular press, we review the dominant business models in key sectors contributing to climate change, and other unsustainable social and economic outcomes, and assess sector performance against the SDGs (see Table 1). From this analysis we identify the positive initiatives towards the SDGs to date, and areas of under-performance driven by what we conceive as unsustainable business models and institutionalised harm. We review the following sectors in detail: energy; transportation; construction; fast moving consumer goods, food and beverage; clothing and textiles; technology, advertising and media; retail, and finance. We briefly discuss mining and extraction, and hospitality and tourism, as these involve similar issues to some of the other sectors. According to the IPCC (Fischelick et al., 2014) energy, mining, transportation, tourism, construction, food and textiles are among the main contributors to human-induced climate change. In addition, the unsustainable business models that drive climate change, such as the low-cost volume driven business model dependent on non-renewable resources, often embody other unsustainable impacts such as poor labour conditions and low pay (Reinecke et al., 2019). Hence, we seek to map multiple (un)sustainable impacts per sector. We also review advertising (Brulle et al., 2020) and the finance sector (Yip and Bocken, 2018), as important overarching sectors driving the economy. Finally, we include technology and durable goods as these are indicative for some of the unsustainable trends in society.

Third and finally, we synthesise the results into an overview of unsustainable business model archetypes. This is based on reviewing each of the dominant unsustainable business models per sector in detail, comparing characteristics, removing any duplicates and combining models where possible, and relabelling them into a cohesive list of archetypes.

Table 1
SDGs and industry responsibility.

Sustainable Development Goals (SDG)	Industry responsibility
1. No poverty	Distribution of wealth creation
2. Zero hunger	Fair distribution of food resources to all
3. Good health and wellbeing	Food nutrition, quality of life improvements, work/life balance
4. Quality education	Contribute taxes to support education system
5. Gender equity	Employment policy
6. Clean water and sanitation	Wealth distribution, deliver affordable solutions
7. Affordable and clean energy	Renewable energy solutions, wind, solar, hydro, hydrogen, storage
8. Decent work and economic growth	Employment policy, dignified work
9. Industry innovation and infrastructure	Investment for the future
10. Reduced inequalities	Distribution of wealth creation
11. Sustainable cities and communities	Affordable, quality homes, sense of place, beauty in the built environment, low carbon solutions, retail and services close to hand
12. Responsible consumption and production	Moderation of marketing and retail activities, choice editing, quality durable products, repair and reuse
13. Climate action	Zero-carbon initiatives
14. Life below water	Stewardship of marine resources, biodiversity protection
15. Life on land	Stewardship of forest and agricultural resources, biodiversity protection
16. Peace, justice and strong institutions	Transparency, ethical business, rejecting corruption and cronyism, and partisan lobbying (this is equally important for all businesses, so it is not specifically spotlighted in the sector-specific analyses).
17. Partnerships for the goals	Partnerships to achieve goals

3. Results

Table 2 highlights the sustainable business models and unsustainable business model activities they seek to target. The original sustainable business model (SBM) archetypes were not developed on a sectoral basis. Going more deeply into the dominant unsustainable business models per sector will give greater insight into the unsustainable business models (UBMs) to transition away from.

The remainder of this section focuses on the unsustainable business model types per sector. While positive SBM examples are observed in most sectors, often combining multiple SBM archetypes within a firm or sector, they are generally niche applications to date (Ritala et al., 2018), and so the overall impact on sector sustainability remains low.

3.1. Energy supply

Of all the industrial sectors, the energy sector has received the greatest attention to date over its direct role in climate change and lack of sustainability credentials. It is the largest contributor to global greenhouse (GHG) gas emissions, responsible for around 35% of total anthropogenic GHG emissions (Bruckner et al., 2014). Annual GHG-emissions growth in the energy supply sector accelerated from 1.7% per year from 1990 to 2000 to 3.1% per year from 2000 to 2010, due to rapid economic growth and increased use of coal (Bruckner et al., 2014). Unsustainability is institutionalised through the exploitation of finite resources, continued burning of fossil fuels and increased usage linked to economic growth. The share of renewables as part of total energy consumption is still less than 20% and energy efficiency efforts fall short of the annual 3% improvement needed at the very least to reach climate targets (UN, 2020).

The business models of all the major players operating in exploration, extraction, refining, processing, and use of fossil fuels must be considered fundamentally unsustainable (Table 3). Multiple options exist to reduce energy sector GHG emissions, including energy efficiency improvements and fugitive emission reductions in fuel extraction, as well as in energy conversion, transmission, and distribution systems (IPCC, 2014), but nonetheless they cannot eliminate GHG emissions. Renewable energy generation technologies such as wind and solar are other options, and there has been significant progress on decarbonising the electricity supply in many parts of the world, but nonetheless, fossil fuels still dominate energy usage (UN, 2020). The industrial sector is particularly difficult to decarbonise. Technological innovations using

Table 2
Sustainable and Unsustainable Business Models, building on archetypes as presented by Ritala et al. (2018) and Bocken et al. (2014).

Groupings	SBM archetypes	Targeting UBMs on:
Technological	Maximise material and energy efficiency	Outdated and inefficient production processes High waste and high emissions business
	Closing resource loops	Linear make-sell-disposal to landfill Under-utilised capacity, idle assets and resources Unused production by-products
	Substitute with renewables and natural processes	Extraction and use of fossil fuels and non-renewable or limited resources Use of polluting, unnatural extraction and production processes
Social	Deliver functionality rather than ownership Adopt a stewardship role	Ownership models that encourage poor asset utilisation Products and services that are detrimental to human health and wellbeing Models built on labour, consumer, or environmental exploitation Opaque environmental and social reporting
	Encourage sufficiency	Built-in planned obsolescence Single use, limited use, poor quality products and materials designed to be discarded after little use Excessive use of plastic packaging Advertising activities that promote unnecessary and over-consumption
Organisational	Repurpose for society/environment	Businesses operating exclusively for economic profit maximisation, for benefit of shareholders to the exclusion of all other stakeholders
	Inclusive value Creation	Global supply and distribution networks, disconnecting consumers from production and impacts of consumption
	Develop scale up solutions	Great concepts that remain niche, ignored, or unable to attract financing

Table 3
Energy supply overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model archetypes	Possible negative impacts	Potential SBM responses	Future outlook
7 Clean energy, 13 Climate action	Progress on SDGs 7, 13, but still high dependency on fossil fuels for heating, industry, transport	Exploitation of finite resources	Resource depletion and environmental degradation	Substitute with renewables and natural processes Maximise material and energy efficiency	Accelerated substitution with renewables (generation and storage). Increasing levels of energy efficiency, and innovation in industrial processes
		Combustion of fossil fuels	Contributing to climate change and pollution	Substitute with renewables and natural processes	

Table 4
Transportation overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model archetypes	Possible negative impacts	Possible sustainable business model responses	Positive future outlook
13 Climate action, 11 Sustainable cities and communities, 15 Life on land, 3 Good health and wellbeing, 12 Responsible consumption and production	Focus on SDG 13, but needs more focus on 3, 11, 12, 13 and 15 (air and sea transport, traffic congestion, sedentary lifestyles, excessive travel)	Exploitation of finite resources	Resource depletion and environmental degradation	Substitute with renewables and natural processes Maximise material and energy efficiency	Substitute with renewables, maximise energy efficiencies, encourage sufficiency through shared-use models, public transport, moderated consumption, reduce planned obsolescence (mandatory longer warranties, repair and upgrade services)
		Combustion of fossil fuels	Contributing to climate change and pollution	Substitute with renewables and natural processes	
		Volume over value	Normalising unsustainable consumption patterns/dependency on excessive and unsustainable consumption patterns	Encourage sufficiency; localised supply systems	

hydrogen for high temperature industrial processes such as steel and cement production are emerging, but few companies are using these expensive new solutions, and the provision of hydrogen itself is energy intensive. Carbon capture and sequestration solutions have been proposed by the energy sector for several decades to mitigate the impact of fossil fuel use, but the technology remains complex and unproven at scale. The only viable business models for the energy sector in the long-term must be built on renewables.

3.2. Transportation

The transport sector produced 7.0 GtCO₂-equivalent of direct GHG emissions and non-CO₂ gases and was responsible for approximately 23% of total energy-related CO₂ emissions in 2010 (Sims et al., 2014). Despite more efficient vehicles and various policies, emissions continue to grow, as passenger and freight activities outweigh current mitigation measures (Sims et al., 2014). Unsustainability is thus institutionalised through the exploitation of finite resources, burning fossil fuels, and the sheer volume of the sector (Table 4).

Fossil fuel-powered vehicles dominate road transport and freight, and while the market for electric vehicles is rapidly gaining momentum it still represents less than 2% of the overall passenger car market (Niestadt & Bjørnåvold, 2019), and electric-powered freight transport is limited. Marine transportation represents a significant part of global trade, and typically uses a dirty polluting form of diesel, and innovation towards electric-powered or hydrogen or ammonia-powered shipping, is only embryonic at present. Aviation has a particularly high environmental impact per passenger- or tonne-mile, and the release of carbon dioxide at high altitude is recognised to be extra damaging (IPCC, 1999). Small-scale electric aviation solutions are coming to market, but as of yet there are no viable sustainable solutions for replacing the long-haul airliners which dominate air travel. Biofuel blends have been introduced to a limited extent, but this has come with other undesirable

impacts on land-use, biodiversity losses, and food supply impacts, although with careful land use and emerging technologies biofuels may still have a role for the future (Field, 2020).

Transportation touches the majority of sectors but is particularly important in global food and goods supply chains, global travel and tourism (Fischedick et al., 2014), increasingly for courier delivery services, and the associated transportation infrastructure such as highways, and the producers of transportation equipment such as the major automotive, shipping and airline manufacturers. Some amount of transportation is absolutely necessary, but the vast volumes of transportation today are unprecedented in human history (e.g., Steffen et al., 2015), driven by globalised supply chains, rising living standards and extensive consumer demands, and ultra-cheap transportation solutions. Business models built on the necessity of fossil-fuel powered transportation, extensive global supply chains, low-cost travel that inadequately prices in the environmental impact, and investment in technologies that perpetuate the use of fossil fuels, are unsustainable. Furthermore, new developments such as the circular economy might lead to *more* transport for reverse logistics, to enable repair, maintenance and remanufacturing (Zink and Geyer, 2017). A fundamental rethink of this sector and our overall use of transportation is needed.

3.3. Construction

Construction is a key contributor to climate change and resource use: in 2010 buildings accounted for 32% of total global final energy use and 19% of energy related GHG emissions (Lucon et al., 2014). This number may even double or triple, due to increased access to adequate housing and electricity in developing countries, population growth, household size changes and increasing global wealth (Lucon et al., 2014). The construction industry (Table 5) is a key contributor to economic development and employment in most nations. Yet, it is a major consumer of resources and a source of environmental impact, and in many parts of

Table 5
Construction overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model type	Possible negative impacts	Possible sustainable business model responses	Positive future outlook
11 Sustainable cities and communities, 13 Climate action, 9 Industry innovation and infrastructure, 15 Life on land	More focus on SDGs 11 and 13 needed. Failing to provide quality affordable and energy efficient housing for society	Unsustainable materials and poor energy efficiency Profit and shareholder value maximisation; not stakeholder value	<ul style="list-style-type: none"> - Depletion of resources - High levels of waste - Contribution to climate change - Exploitation of environment and society to maximise profits - Exploitation and health and safety of workers - Disregard of local culture and needs - Undermining basic right to affordable, quality housing 	<ul style="list-style-type: none"> - Maximise material and energy efficiency (e.g., factory built) - Closing resource loops - Substitute with renewables and natural processes - Repurpose for society/environment - Inclusive value creation 	Circular economy strategies (less material, durability, efficiency, no waste) integrated in the business models; repurposing for society and inclusive value creation to take care of the natural environment (e.g., regeneration) and workers and society (health, safety, culture)

the world the construction industry is synonymous with poorly conceived developments, corruption, dubious build quality, and health and safety issues – all of which cause significant social and environmental impact (e.g., [Asmi et al., 2012](#)).

There are four issues of particular significance from a sustainability perspective. Firstly, the materials and construction techniques using steel, cement and concrete are huge emissions sectors ([Allwood et al., 2012](#)), with high embedded carbon emissions, environmental impacts of quarrying and production, waste during the construction process, and difficulty in recycling and reusing materials at end of life. Hence, the circular economy focused on reusing products and materials and eliminating waste has become a source of inspiration in the sector ([Leising et al., 2018](#)). Secondly, the built environment is a major consumer of energy for heating and appliances – zero carbon homes such as passive houses, and heat-pumps and renewable energies are well proven, but their use by developers is still limited. Thirdly, the biggest constructors focus on delivering housing for profit maximisation, with seemingly little concern for the customer living experience and the local context, and scant regard for the long-term legacy for future generations of sub-standard housing stock. Place Alliance (2020) finds that the design of new housing developments in England is overwhelmingly ‘mediocre’ or ‘poor’, with less-affluent communities the worst affected, according to a national audit. Corporate scandals of Persimmon and the Grenfell fire disaster in the UK have highlighted some of the unethical and unsustainable practices ([Grenfell Tower Enquiry, 2020](#)). At the other end of the spectrum, luxury properties and trophy office buildings are built for the world’s wealthiest, representing a waste of natural resources often with little regard for sustainability. The fourth key sustainability issue relates to the property market structure, characterised by greatly inflated land prices driven by deregulated mortgage markets, artificial market restrictions on new builds, and the commoditisation of housing by buy-to-let landlords and Airbnb, reducing availability of homes to buy and encroaching on traditional jobs in the hospitality sector ([Nieuwland and Van Melik, 2020](#)). Market failures in the property market are increasingly compromising the basic human right to shelter.

There are some excellent developments around the world that have demonstrated a passion for high quality and affordable homes for all, and governments such as the UK are attempting to raise standards to improve quality and beauty of developments and create better sense of place within communities ([UK GOV, 2020](#)). There are also efforts underway to expand the market for modular, factory-built homes and offices, that offer improved performance and reduced waste. The ‘tiny

houses’ concept aims to offer housing in a much-reduced space, reducing the need for materials and precious space. However, some of the largest developers, supported by their partners and suppliers, and enabled by inadequate regulation, continue to build their success on unsustainable business models, and lobby to maintain the status quo.

3.4. FMCG, food and beverage

The global fast-moving consumer goods (FMCG), food and beverage industries have been prominent on the world stage for their high-profile sustainability initiatives (e.g., [PepsiCO, 2020](#); [P&G 2020](#); [Unilever, 2020](#)). The raw materials for much of the sector come from agriculture, forestry and other land-use which represents about 24% of climate changing greenhouse gas emissions ([Allwood et al., 2012](#); [EPA, 2020](#)). Adding in emissions from electricity and heat production associated with water heating, cooking and appliances, FMCG companies could be responsible for over a third of global emissions through their products and usage ([Clarke et al., 2019](#)). Taking into account that about 90% of the sector’s carbon emissions lie in the extended value chain and product usage, its potential influence can be large ([Clarke et al., 2019](#)).

Despite best efforts by FMCG companies, on issues such as reducing plastic, influencing consumer behaviour, and improving value chain practices, they still present numerous unsustainable business models related to the volume of the industry, complex value chains, the type of offerings and the take-make dispose model (Table 6). Industrial-scale farming based on extensive use of pesticides and synthetic fertilizers, monocrops, and extensive animal husbandry, have led to deforestation and degraded topsoil quality, causing a dramatic loss in pollinators, biodiversity and habitat loss, and polluting waterways with agricultural run-off ([IPCC, 2019](#)). One effect of this is that the nutritional value of the global food system is also declining. Efforts to improve sustainable sourcing have been introduced with varying degrees of success, e.g., less than 45% of palm oil is estimated to be supplied from physically certified sources ([Clarke et al., 2019](#)).

FMCG, food and beverage production are globalised systems today, with a vast carbon footprint associated with transportation, often built on exploitation of labour and resources in developing nations to keep prices artificially low ([Reinecke et al., 2019](#)). Approximately a third of all edible food is wasted within the global food production system ([Papargyropoulou et al., 2014](#)). Waste is also seen in the form of over-consumption and obesity in some parts of the world, while at the same time, several billion of the world’s poorest remain malnourished

Table 6
FMCG overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model type	Possible negative impacts	Possible sustainable business model responses	Positive future outlook
2 Zero hunger, 3 Good health and wellbeing, 14 Life below water, 15 Life on land, 12 Responsible consumption and production, 13 Climate action, 17 Partnerships for the goals	Focusing on SDGs 2 and 3 (in parts of the world) and SDG 12. Still a lot of work needed for SDGs 2, 3, 12, 14, 15 and 17: to deliver global zero hunger, and more health and well-being (e.g., tackling obesity, self-image issues etc) in collaboration with others	Complex opaque global value chains Volume over quality and value Unhealthy offerings Take-make-dispose model	<ul style="list-style-type: none"> - Monocrops to cater for volumes - Cold chains with high carbon footprint - Loss of perishables during transport - High impact of global transportation - Exploitation/production where cost is lowest - Low-cost foods facilitate over-consumption and careless attitudes to waste in developed world. - Over-exploitation of resources - Normalising unsustainable consumption patterns/dependency on unsustainable consumption patterns - Negative health outcomes - Over-exploitation of resources 	<ul style="list-style-type: none"> - Maximise material and energy efficiency - Inclusive value creation and localised production - Repurpose for society/environment - Encourage sufficiency - Repurpose for society/environment - Adopt a stewardship role - Encourage sufficiency - Closing resource loops 	Fair health and nutrition outcomes foremost consideration (choice editing, or manufacturer-responsibility for poor health outcomes), localisation to reduce food waste, resource, water and climate stewardship

(FAO et al., 2020). Processed foods, refined sugars, additives and preservatives, with little nutritional value and addictive qualities, are a significant contributor to the rise in non-communicable diseases such as diabetes and obesity (Baker et al., 2020). These products are not only unhealthy but are usually sold in single-use packaging and so are a major contributor to the global problem of plastic packaging waste. Discarded plastic packaging is increasingly recognised as a major global issue: to date, only 3% of global packaging is reusable (Ellen MacArthur Foundation, 2019). Industry collaboration on grand challenges such as plastic

reduction will become more important (Ellen MacArthur Foundation, 2019). In addition, there is an important role for the government: while some countries have introduced sugar taxes and advertising restrictions, much more needs to be done through regulation and education, to counter the negative impacts of production and consumption.

The global food system is yet failing in the primary objective of providing a healthy diet and balanced nutrition for all. The business models in the food and beverage sector, based on exploitation of the environment and society, complex opaque global supply chains rather

Table 7
Clothing and textiles overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model type	Possible negative impacts	Possible sustainable business model responses	Positive future outlook
3 Good health and wellbeing, 8 Decent work and economic growth, 12 Responsible consumption and production, 14 Life below water, 15 Life on land, 17 Partnerships for the goals	Focus on SDGs 3, 8, and 12; Failing on SDGs 12, 15. Debatable value for SDG 3 (driving over consumption)	Complex global value chains Exploitation of finite resources Unsustainable material, water and energy usage Volume over value (Quantity over quality) Planned obsolescence	<ul style="list-style-type: none"> - High impact of global transportation - Exploitation of labour/production located on lowest cost - Low-cost clothing enables over-consumer and clothing to be treated as essentially disposable. - Resource depletion - Depletion of resources - Increasing levels of waste - Contribution to climate change - Unsustainable water usage (e.g. drying up of the Aral Sea; Allwood et al., 2006). - Normalising unsustainable consumption patterns/dependency on unsustainable consumption patterns 	<ul style="list-style-type: none"> - Inclusive value creation - Repurpose for society/environment - Substitute with renewables and natural processes - Maximise material and energy efficiency - Closing resource loops - Substitute with renewables and natural processes - Encourage sufficiency - Closing resource loops 	Slowed fashion cycles, product longevity (eliminate the cheapest low-quality products, mandatory manufacturer warranties), mainstream repair and reuse services

than localised production and consumption, high animal-based diets, processed products and extensive single-use packaging, are unsustainable.

3.5. Clothing and textiles

The clothing and textiles industry (Table 7), like food production, is a globalised industry, and one of the top five sectors for environmental impacts and is infamous for labour exploitation and unsafe working conditions (Reinecke et al., 2019). The clothing industry employs more than 300 million people along the value chain, many of whom are in developing countries (Ellen MacArthur Foundation, 2017). Whereas in the last 15 years, clothing production has nearly doubled, clothing utilisation – the average number of times a garment is worn – has decreased by nearly 40% (Ellen MacArthur Foundation, 2017). In the UK, on average, consumers send 30 kg of clothing and textiles per capita to landfill each year (Allwood et al., 2006). Environmental impacts arise from cotton production which is land and water intensive and uses extensive pesticides, the use of oil-based polyester materials, chemical processes and energy used during production, logistics in extensive supply chains, micro-plastics pollution arising from laundering, and large volumes of waste garments (Claudio, 2007; Bukhari et al., 2018).

A particularly egregious aspect of the clothing sector is the rise of fast fashion, where constantly evolving fashion trends, cheap, and low-quality clothing with short anticipated lifespans, result in huge volumes of prematurely discarded clothing, or clothing being barely used (Reinecke et al., 2019). A related topic to fast fashion is the concept of planned or premature obsolescence, more usually applied to durable products, appliances and cars, where a product is consciously designed to fail earlier than it needs to in order to stimulate ongoing economic activity (Bakker et al., 2020; Maitre-Ekern and Dalhammar, 2016). Business models based on such waste of resources as seen in fast fashion

clothing and any form of unnecessary planned obsolescence are deeply unsustainable, as are business models based on exploitation of resources and labour.

3.6. Technology

Sophisticated technological solutions are increasingly commonplace in every aspect of modern life, in our vehicles, workplaces, communications and social interactions and entertainment. Global electronic waste is as high as 50 million tonnes per annum and is expected to more than double by 2050 (Ryder and Houlin, 2019). Moreover, 80% of the electronic waste sent for recycling is shipped and dumped, often in developing countries (Ryder and Houlin, 2019). Thus, unsustainability is apparent from the sheer volume of new devices and technologies, the demand for finite resources (including critical raw materials; Erdmann and Graedel, 2011) and energy, and the impact on people (Table 8).

Modern technologies typically contain resources that involve significant pollution in extraction and processing and exploit low-paid labour in dangerous work environments (Arushanyan, 2016). Assembly (and later, disassembly and recovery) of devices is also often undertaken through exploitive work practices in the developing world. The rapid and continuous evolution of technology over the past few decades has seen a vast surge in the volumes of production, and similarly in electronic waste streams, with products rapidly discarded in favour of the next great innovation as product lifecycles have grown shorter, and repair or upgrade more difficult (Bakker et al., 2014, 2020, 2020).

In addition to the physical consumer devices, a rapidly expanding impact of our technology solutions is hidden from view in the cloud computing services and blockchain technologies and the vast network of online storage and data processing systems that drive delivery of digital content and services. The biggest players in the industry are investing heavily in renewable energy solutions, but nonetheless the carbon

Table 8
Technology overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model types	Possible negative impacts	Possible sustainable business model responses	Positive future outlook
3 Good health and wellbeing, 7 Clean energy, 13 Climate action, 12 Responsible production and consumption	Focus on SDGs 3, 7 and 13, but more work needed on 12 through longer lasting products and 3 by focusing on the positive role of technology	Volume over value (Quantity over quality, and rapid replacement cycles)	- Normalising unsustainable consumption patterns/ dependency on unsustainable consumption patterns	- Encourage sufficiency - Closing resource loops	Enhanced product lifecycles (upgrade and repair, longer warranties), closed loop recycling and reuse, encourage sufficiency, social stewardship to ensure real social benefit and reduce negative outcomes
		Exploitation of finite resources	- Resource depletion, environmental degradation, pollution	- Substitute with renewables and natural processes - Encourage sufficiency - Closing resource loops	
		Planned obsolescence	- Normalising unsustainable consumption patterns	- Maximize material and energy efficiency - Closing resource loops - Substitute with renewables and natural processes	
		Unsustainable material and energy usage	- Depletion of resources - Increasing levels of waste - Contribution to climate change	- Encourage sufficiency - Inclusive value creation - Stewardship	
		Promoting unsustainable behaviour patterns	- Undermining traditional social norms, activities, and values - Health impacts arising from more sedentary lifestyles and mental health issues from less real social interaction		
		'Human-replacement'	- Unemployment - Societal exclusion (those unfamiliar with new technologies) - Unforeseen impacts (e.g. threats of AI)	- Inclusive value creation - Repurpose for society/ environment	

footprint and the hardware requirements of the sector continues to grow exponentially: the projected electricity demand from information and communications technology (ICT) is forecasted to be 21% of the total global demand by 2030 (Jones, 2018).

Many of the emerging internet platform-based business models, while delivering significant new consumer value, also have undesirable social impacts, such as potential for data misuse, manipulation, unauthorised surveillance, circumvention of regulations, and undermining local social structures, profits and tax collection (Zuboff, 2019). Young people are highly dependent on the internet: in the US, 95% of teenagers have access to a smartphone and 45% say that they are online nearly constantly (Anderson and Jiang, 2018), which raises potential concerns over physical activity and social interactions (Mullan, 2018). Moreover, the increasing use of automation and artificial intelligence are upending traditional employment models and exacerbating inequalities. It is estimated that robotisation has already led to an 11% decrease in employment in emerging countries (Carbonero et al., 2020). Implemented in isolation of broader societal considerations and policies, these trends may prove deeply unsustainable in the long-term.

3.7. Advertising and media

Advertising and promotion should be a contentious issue as they can be used to stimulate and exacerbate unsustainable levels of consumption (Table 9). The global advertising market in 2019 was worth US\$660bn. Traditional media still plays an important role, but the rise of social media, data analytics and artificial intelligence is enabling rapid growth in digital with 50.1% worldwide going to digital marketing in 2019 (eMarketer, 2019).

The business models of some of the world’s biggest companies are built almost entirely on advertising, including Google, Facebook, SnapChat, YouTube, along with the vast majority of free-to-use mobile apps, social media influencers, professional sports, commercial broadcasting, and news providers. The big brands spend billions of dollars through these channels to promote their products, and also work with the major retailers to make sure their products are best placed to grab consumers’ attention in a crowded marketplace. Some level of advertising is an essential feature of a well-functioning marketplace to provide product information and raise awareness of new and better solutions. However, advertising becomes inherently unsustainable for the planet and society when it is built on highly sophisticated tools and techniques to attract, manipulate and maintain consumer engagement through appealing to people’s vanity, insecurities, ignorance, etc. (N’Goala, 2015), and encourages unsustainable consumption.

A more sustainable world would perhaps see advertising heavily constrained and monitored to present only factual information without aspirational imaging, or outright bans on unsustainable categories of products, as is now the case for tobacco in most developed countries.

Table 9
Advertising and media overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model type	Possible negative impacts	Possible sustainable business model responses	Positive future outlook
12 Responsible consumption and production	Needs major focus on SDG 12 The business model is built on driving consumption, with little self-regulation, or moderation	Volume over value (Quantity over quality) Promoting unsustainable behaviour patterns	- Normalising unsustainable consumption patterns/dependency on unsustainable consumption patterns - Normalising unsustainable consumption patterns/dependency on unsustainable consumption patterns - Negative societal impacts on health and well-being associated with unhealthy products, unhealthy social pressures, etc.	- Encourage sufficiency - Repurpose for society/environment - Encourage sufficiency - Repurpose for society/environment - Adopt a stewardship role	Encourage sufficiency Repurpose for society/environment Adopt a stewardship role Advertising has a role to play in educating and raising awareness of better solutions. Choice editing, limit aspirational imaging and manipulative marketing. Shift away from advertising revenue models to subscription models.

Alternatively, social media, search engines, sport and entertainment might be funded by subscription models or public resources rather than funded through advertising.

3.8. Retail

The retail sector (Table 10) also plays a key role in driving consumption. The industry suffers from overstocking (and having to dispose of unsold stock), the negative impacts of supply chains and logistics, and issues such as excessive packaging (Deane, 2021). In 2017, various well-known brands made the headlines for burning millions of dollars’ worth of their own unsold stock to keep their value artificially high (Siegle, 2018). In the EU alone, inhabitants generated about 174 kg of packaging waste per annum (Eurostat, 2020).

Much of the retail sector is needed and beneficial, but overstocking, retail of poor-quality unsustainable foods and products, and stimulation of impulsive and excessive consumption, is essentially acting unsustainably. Promotions such as the now global ‘Black Friday’ phenomenon, carefully managed instore product promotions (Kacen et al., 2012), targeted online promotions, and buy-now-pay-later credit schemes (Ah Fook and McNeill, 2020) often encourage unnecessary consumption. Several major retailers have experimented with choice-editing, to eliminate the most damaging or poor-quality products from their shelves (Bocken, 2017), but this is on a relatively small scale to date.

In addition to the focus on volume, unsustainable consumption patterns and unsustainable resource use, the human side of the retail model also presents broader unsustainability issues. Online retail, led by firms such as Amazon and Alibaba, has delivered great benefits for consumers and suppliers, but the business model has decimated the traditional high-street retailers, eliminating local retail jobs, and diminishing the sense of community centres within towns and cities, reducing every-day social interactions, and encouraging and enabling the population to more easily over-consume. Global platforms such as Amazon and Alibaba take profits out of local communities and entire countries, while avoiding contributing to the local tax system, which undermines the provision of community services and infrastructure on which a well-functioning society depends (Olbert and Spengel, 2017). The online business model gave rise to ‘gig economy’ low-paid insecure jobs in warehousing and logistics that offer little for employees’ well-being and development (Boons and Bocken, 2018; Martin, 2016). Fulfilment services are becoming an increasingly significant environmental burden.

3.9. Financial and professional services

Enabling and driving all the sectors discussed above are the providers of financial capital and the professional services helping to channel investments to industry and facilitate economic growth (see

Table 10
Retail overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model type	Possible negative impacts	Possible sustainable business model responses	Positive future outlook
12 Responsible consumption and production, 3 Good health and wellbeing, 11 Sustainable cities and communities	Focus on SDG 3; Needs major focus on SDG 12, and greater focus on SDG 11 to retain sense of community	Volume over value (Quantity over quality) Promoting unsustainable behaviour patterns Unsustainable material and energy usage 'Human-replacement'	<ul style="list-style-type: none"> - Normalising unsustainable consumption patterns/dependency on unsustainable consumption patterns - Normalising unsustainable consumption patterns/dependency on unsustainable consumption patterns - Depletion of resources - Increasing levels of waste - Contribution to climate change - Unemployment and societal disruption at the local level - Societal exclusion (those unfamiliar with new technologies) - Unforeseen impacts (e.g. threats of AI) 	<ul style="list-style-type: none"> - Encourage sufficiency - Closing resource loops - Encourage sufficiency - Repurpose for society/environment - Maximise material and energy efficiency - Closing resource loops - Substitute with renewables and natural processes - Inclusive value creation - Repurpose for society/environment 	Return to localised shopping options, choice-editing and end to promotional activities that stimulate over consumption, encourage sufficiency, repurpose for social value, Shift to reusable packaging/no packaging solutions to reduce plastic waste

Table 11
Financial and professional services overview.

Primary SDGs (Materiality)	Progress	Unsustainable business model type	Possible negative impacts	Possible sustainable business model responses	Positive future outlook
1 No poverty, 8 decent work and economic growth, 10 reduced inequalities, 7 clean energy, 9 industry innovation, 13 Climate action	Focus on SDGs 7, 9, 13, but needs more focus on SDGs 1, 8, 10: Finance plays a key role in economic activity, and should focus more on job creation, wealth distribution and reducing inequality	Profit and short-term shareholder value maximisation; not stakeholder value 'Human-replacement'	<ul style="list-style-type: none"> - Exploitation of environment and society to maximise profits - Unemployment - Societal exclusion (those unfamiliar with new technologies or unable to afford these) - Unforeseen impacts (e.g., threats of AI) 	<ul style="list-style-type: none"> - Repurpose for society/environment - Inclusive value creation - Inclusive value creation - Repurpose for society/environment 	<ul style="list-style-type: none"> Inclusive value creation Repurpose for society/environment Broad focus on social and environmental value creation. Specific restrictions on investments that do not progress SDG objectives. Transparent ESG or SRI assessment

Table 11). There have been changes challenging the dominant business models, including sustainable financial products, responsible lending practices, and digitalisation to reduce material usage (Yip and Bocken, 2018). Efforts to integrate Environmental, Social and Governance (ESG) measurements into financial reporting and investment planning have gained momentum over the past decade, and impact investment is gaining traction (Cornfield, 2020). ESG investing has grown rapidly over the past decade, and professionally managed portfolios that integrate key elements of ESG assessments now exceed USD 17.5 trillion of the USD 400 trillion in global financial assets (Boffo and Patalano, 2020). IEA, 2020, ESG-related traded investment products available to institutional and retail investors exceeded USD 1 trillion for the first time, and these continue to grow rapidly (Boffo and Patalano, 2020). Drivers of this transition include a recognition of the potential for investment risk reduction, and long-term value creation. Despite the apparent progress, there are still significant segments of the financial and professional services sectors yet to engage meaningfully with sustainability, pursuing a business model of short-term profit maximisation over longer-term benefit (Table 10). Investments in fossil fuels are still higher than in climate-related activities (UN, 2020). Finally, the financial industry, with exceptions, is mainly focus on short-term value creation (Smit, 2019). While companies like Unilever have declared to stop

quarterly reporting as it creates the wrong incentives, this has not yet received wide following and many of the financial institutions are focused on short-term shareholder value creation.

The continuing prevalence of unsustainable business models identified across most industry sectors raises questions about the tangible impact of ESG assessments in their current form to transform the institutionalised unsustainable business models. The disconnect is evident when major financial institutions tout their sustainability credentials related to carbon-offsetting their travel and creating green office spaces for their employees (Yip and Bocken, 2018), while seemingly ignoring the ongoing environmental and social impact of the industries in which they invest. Any financial institution, fund, venture capitalist, or professional services provider that is supporting damaging environmental and societal practices is operating what should be viewed as an unsustainable business model.

3.10. Other sectors and overview

In the interests of space, a detailed discussion of other sectors such as the primary sector of mining and extraction, and secondary non-consumer facing sectors with a high environmental burden such as paper, plastics and metal and steel (Fischedick et al., 2014); as well as

Table 12
UBM archetypes.

High-level categories	UBM archetypes	Description of UBM	SBM archetype response
Unsustainable operations	1. Environmental resource exploitation and waste UBM	UBMs focused on exploitation and waste of limited finite resources, using resources faster than they can be regenerated, linear make-use-dispose creating waste to landfill and pollution at any point in the production and product lifecycles, & combustion of fossil fuels, leading to resource depletion and environmental degradation, and contributing to climate change and pollution.	<ul style="list-style-type: none"> - Maximise material and energy efficiency - Substitute with renewables and natural processes - Closing resource loops - Deliver functionality rather than ownership - Adopt a stewardship role
	2. Human resource exploitation and waste UBM	UBMs dependent on cheap or forced labour, unsafe working conditions, creating insecure livelihoods, poor work/life balance, or leading to societal exclusion and unemployment.	<ul style="list-style-type: none"> - Adopt a stewardship role - Inclusive value creation
	3. Economic exploitation UBM	UBMs dependent on global technology platforms, AI, etc that lead to direct or indirect human replacement, global economic disparities, and concentration of power and employment, and wealth accumulation for a privileged few.	<ul style="list-style-type: none"> - Repurpose for society/environment - Inclusive value creation
Unsustainable consumption	4. Unhealthy or unsustainable offering UBM	UBMs focused on creating and selling products and services that are inherently unhealthy or unsustainable (e.g., fast food in disposable unrecyclable packaging), or that undermine a balanced healthy active lifestyle, safe and comfortable living, and flourishing communities.	<ul style="list-style-type: none"> - Repurpose for society/environment - Substitute with renewables and natural processes - Encourage sufficiency - Adopt a stewardship role
	5. Quantity over quality and value UBM	UBMs dependent on unsustainable levels of consumption, promoting and enabling unnecessary consumption levels, planned premature product obsolescence to drive continuous repeat sales, and failing to consider the implications on legacy for future generations.	<ul style="list-style-type: none"> - Repurpose for society/environment - Encourage sufficiency - Closing resource loops - Deliver functionality rather than ownership
	6. Addictive consumption pattern UBM	UBMs normalising and increasing dependency on unsustainable consumption patterns through addictive products and services.	<ul style="list-style-type: none"> - Repurpose for society/environment - Encourage sufficiency - Adopt a stewardship role
Unsustainable governance	7. Complex opaque global value chain UBM	UBMs dependent on global arbitrage between rich and poor nations that allow the developed world to access foods and products artificially cheaply, with high impact of global transportation, creating a disconnect between producers and consumers, undermining employment in consumer countries, creating significant trade imbalances, and with a lack of transparency and accountability on impacts on society and the environment.	<ul style="list-style-type: none"> - Repurpose for society/environment - Adopt a stewardship role - Inclusive value creation
	8. Short-term shareholder – not stakeholder value UBM	UBMs optimising profit and economic gain over balancing with stakeholder value, of those affected by or affecting the business.	<ul style="list-style-type: none"> - Repurpose for society/environment - Adopt a stewardship role
	9. Financing and supporting unsustainable practices UBM	Investments and financial services' support for other unsustainable UBMs; supporting tax avoidance, spreading of fake news etc.	<ul style="list-style-type: none"> - Inclusive value creation - Adopt a stewardship role - Repurpose for society/environment

hospitality and tourism, and consumer durable goods are not included here. Generally, the issues observed repeat those discussed in sectors above. For example, mining and extraction faces similar issues to the energy extraction industry; hospitality and tourism combines most of the issues observed in the transportation, construction, retail and food sectors. Consumer durable goods have similar issues to those observed in transportation in terms of the dominant model being to 'make and sell for private ownership'. Many durable goods from laptops to microwaves suffer from declining product lifetimes whether or not this is 'planned' obsolescence where products are designed to fail prematurely and encourage repeat sales (Bakker et al., 2014; Maitre-Ekern & Dalhammar, 2016).

Based on the preceding analysis of industry sectors, Table 12 presents a synthesis of the core Unsustainable Business Model (UBM) patterns observed and the possible Sustainable Business Model (SBM) responses. UBM archetypes are categorized according to those driving 'unsustainable operations', 'unsustainable consumption', or 'unsustainable governance'. As shown, the SBM responses do not seem to require any new archetypes beyond those previously identified in the literature, but there is some way to go to implement these fully across all industry sectors. This does illustrate the need for combinations of SBM archetypes implemented together for real sustainability. Moreover, this illustrates that tackling these core UBMs largely requires moving beyond the SBM archetypes of efficiency, net-zero and circularity that are the current focus across industry, to embrace the more 'strongly sustainable' archetypes of stewardship, inclusive value creation, and repurposing for society and environment.

4. Discussion

This article investigated the following: What are the dominant unsustainable business model types per sector that institutionalise social and environmental harm, and hold back progress on the SDGs, and what are the potential sustainable business model responses? The contributions are as follows: (1) we identify a range of unsustainable business model practices, (2) we introduce a hierarchy of different SBM responses and (3) we identify implications for business and policy.

First, we presented a review of unsustainable business model (UBM) practices across the world's major sectors, illustrating that although there are positive initiatives underway, they only target a part of what is wrong with our industrial system, and fall short of delivering on the SDGs. The most problematic business models and practices are based on the use of fossil fuels and non-renewable resources, polluting technologies, excessive plastic packaging, intensive farming and ultra-processed foods, fast fashion, built-in obsolescence and lack of repair and upgrade solutions, complex supply and distribution, labour and environmental exploitation and extensive marketing-driven over-consumption. Above these industrial sectors, the finance sector facilitates business through its investment decisions. Although ESG and impact investing are having some influence, much of the financial activities still fail to adequately consider the full impact of their investment strategies. There is an urgent need for the finance sector, and indeed all firms to look well beyond the immediate impacts and benefits of their own business operations and look at what they enable or cause upstream and downstream through their business actions – e.g., finance enabling the perpetuation of unsustainable business models. Another 'overarching sector', that plays a fundamental role in driving unsustainable levels of production and consumption is the advertising and media sector, which only recently started to challenge its foundations. It was found that UBMs are still deeply embedded throughout the industrial system and all of today's major industries are still built on at least partially unsustainable business models, echoing recent work by Ritala et al. (2021). The UBM archetypes indicate potential dominant business models to de-institutionalise more generally, and at a sectoral level. The granularity of the UBM archetypes seeks to give new perspectives on UBMs beyond the discourse, for example, about the dominant linear vs. circular model (e.g.,

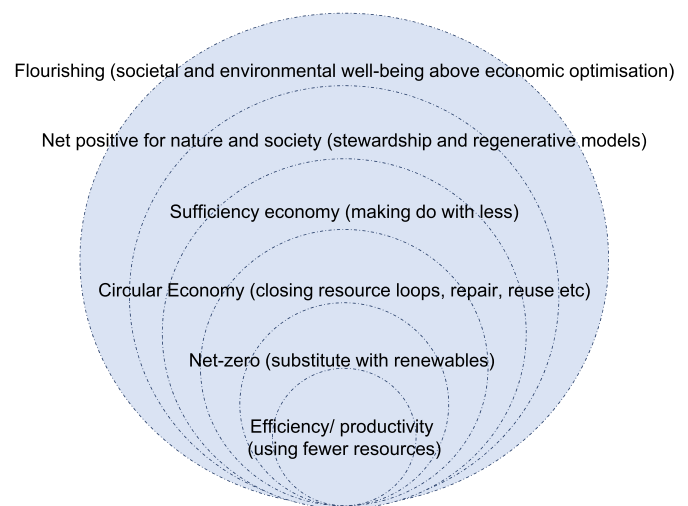


Fig. 1. Hierarchy of SBM archetypes.

Geissdoerfer et al., 2017) and provides future research directions on de-institutionalising UBM archetypes. They could also present companies with exemplars to transform their unsustainable business models.

Second, we have explored the need for new SBM archetypes and conclude that the SBM archetypes previously presented (Bocken et al., 2014) cover the key problem areas. The issue is that applying just one SBM archetype in isolation is unlikely to deliver real sustainability and business models need to be consciously designed to deliver sustainability improvements (Tukker, 2004, 2015, 2015). Also, SBM archetypes are generally applied too narrowly, to only specific parts of the business, rather than a system-wide approach as recommended by various authors (e.g., Stubbs and Cocklin, 2008; Bocken et al., 2013; Cramer, 2020), and as a result the impacts tend to be rather limited. There are many cases where firms are focusing on one aspect of sustainability in their business (e.g., net-zero carbon) but fail to address the bigger core institutionalised unsustainability issues of their industry. For example, beverage companies are going to great lengths to recycle their plastic bottles, while their core business purpose remains the production and marketing of sugar-filled beverages known to be causing health problems. This may just be a question of priorities and maturity of concepts and might be expected to improve over time, but nonetheless, a more comprehensive approach to sustainability that honestly appraises materiality and the true unsustainability of many of our firms and industries is urgently required. The SBM archetypes as originally conceived were always viewed as complementary, with a need to implement several archetypes in unison to achieve real sustainability (Bocken et al., 2014). It is clear that firms need to incorporate most, if not all of the SBM archetypes, and ultimately strive to be supportive of a flourishing environment and society. As such, it is helpful to conceptualise the SBM archetypes in a 'hierarchy' moving progressively from 'less unsustainable' to more 'strongly sustainable'. Building on the original SBM archetypes and recent work on regenerative business models (Elkington, 2020), and human and environmental flourishing (Ehrenfeld, 2019), we propose an overview in Fig. 1. Businesses and policymakers should acknowledge the need to aim for success at every level and set ambitions to ultimately target solutions at the top of the diagram. That said, this study also suggests that a more nuanced approach to use of SBMs is appropriate, depending on the materiality per industry sector.

Third, looking at the bigger picture, businesses and policymakers need to be asking themselves, do we really need a product or service for the well-being of humanity and the planet? Even if it is beneficial, could we manage with less, or is there a better way of delivering it? The recent COVID-19 pandemic has shown that the developed world can manage with substantially less consumption than we might have previously considered necessary, in terms of shopping and travel and commuting

for example. This has been difficult for the economy and employment, but temporarily, consumption of natural resources and fossil fuels reduced significantly, traffic noise and congestion reduced, air quality improved, and wildlife and nature even started to make a resurgence as tourism levels dropped (Rupani et al., 2020). A fundamental rethink about economic priorities and concepts of value is needed and may represent a once in a generation opportunity to capitalise on behavioural changes to restructure the economy, dismantle some of the dominant business models and institutionalised sustainability problems, and eliminate some of the least desirable aspects of non-essential over-consumption. To address the fundamental challenges, business models will increasingly need to be conceived with a cross-sector approach for successful societal transformation, as discussed by Sarasini and Linder (2018), e.g., combining the energy, transport, construction and retail sectors under a new unified business model. Until this happens at scale, cross-linkages and inter-dependencies on other sectors, and the existing business models of other sectors may hamper transitions by reinforcing the current system (Bidmon and Knab, 2018). While some of the UBMs might be tackled directly with new business models, intervention in the form of greater regulation of advertising and finance will be needed, and consumption taxation and subsidies will be needed to shift values away from poorly sustainable products to the more healthy, durable, ethically sourced alternatives, rather than relying on current premium pricing models that exclude many. In some sectors, public investment in supporting infrastructure may be necessary to stimulate market adoption (Mersky et al., 2016). Moreover, coordinated global regulatory and tax code changes will be required to address the more complex issues associated with the rapidly expanding global digital platforms and their impact on local economies, employment and social sustainability (e.g., Khan, 2018; Zucman, 2015).

Finally, many have argued that businesses due to their capitalistic characteristics cannot be expected to take sufficient responsibility for the common goods and sustainable development and suggest SDG-based mission-driven government has to take care of the regulatory framework within which sustainable business models can function and thrive (e.g., Ehrenfeld, 2019; Mazzucato, 2021). One answer might lie in the further development of new organisational forms (e.g., benefit corporations or hybrid organizations). Yet, many of the reviewed sectors (e.g., energy, transportation) are expected to grow exponentially if no further action is taken, and the question is whether this growth should be curbed or more heavily regulated for sustainability (Steffen et al., 2015). This also entails designing the regulatory framework within which UBMs cannot function and thrive – i.e., make them economically unsustainable. By identifying the most unsustainable business models currently in use today, this paper has sought to stimulate debate on how policymakers, investors, and industrialists, might work together to educate, encourage societal shifts in attitudes, and regulate and legislate to drive the needed transformation in business models and the ways we live and work to embed real sustainability.

5. Conclusions

A review of the sustainability performance of major industry sectors finds that our modern world depends on endless environmental exploitation and consumerism of short-lived products to keep the economy going, while failing to house its population in quality accommodation, or provide food sustainably. This is unsustainable in nearly every dimension and is institutionalised through pervasive unsustainable business models. A fundamental reappraisal of the primary purpose of most industry sectors and materiality for sustainability seems necessary if we are to make headway on delivering on the UN SDGs.

A comprehensive review on sustainable business models was conducted in 2014 (Bocken et al., 2014) and followed by later work (e.g., Ritala et al., 2018) to inspire transformation of business practices towards sustainability. While academic and business interest in sustainable business models has surged, business progress towards sustainable

business model innovation has lagged behind (Ritala et al., 2018; WBCSD, 2018). As such, this study investigated the following: What are the dominant unsustainable business model types per sector and what are the potential sustainable business model responses? Based on an analysis of dominant business models in key industries (e.g., energy, transport, construction, clothing, food) a list of nine Unsustainable Business Model (UBM) archetypes was developed:

1. Environmental resource exploitation and waste UBM
2. Human resource exploitation and waste UBM
3. Economic exploitation UBM
4. Unhealthy or unsustainable offering UBM
5. Quantity over quality and value UBM
6. Addictive consumption pattern UBM
7. Complex opaque global value chain UBM
8. Short-term shareholder – not stakeholder value UBM
9. Financing and supporting unsustainable practices UBM

Awareness of these dominant UBMs provides insight into the dominant business models that require transformation. To this end a framework, to respond to these UBMs, a list of SBM responses was developed (Table 12) as well as a hierarchy of SBM responses: including the archetypes of efficiency/productivity driven, net zero, circular economy, sufficiency economy, net positive and flourishing SBM archetypes (Fig. 1). The success of the business implementation and transformation will depend on the holistic integration of sustainability principles into the way business is done. The concept of UBMs aims to stimulate debate on how policymakers, investors, and industrialists, can take action to tackle the unsustainable business model patterns in society, and provides a preliminary framework for further in-depth research into institutionalised unsustainable business practices.

CRedit authorship contribution statement

Nancy M.P. Bocken: Conceptualization, Methodology, Investigation, Resources, Writing – original draft, Writing – review & editing.
Samuel W. Short: Conceptualization, Methodology, Investigation, Resources, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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