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SDG: 9
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Environmental, Social and Governance and Sustainable Development in Healthcare

Sustainable Development Goals Series

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ISSN 2523-3084 ISSN 2523-3092 (electronic)
Sustainable Development Goals Series
ISBN 978-981-99-1563-7 ISBN 978-981-99-1564-4 (eBook)
<https://doi.org/10.1007/978-981-99-1564-4>

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This Springer imprint is published by the registered company Springer Nature Singapore Pte Ltd. The registered company address is: 152 Beach Road, #21-01/04 Gateway East, Singapore 189721, Singapore

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Sustainable Development in Healthcare Through an Environmental, Social and Governance Approach

1

Abstract

This chapter briefly introduces the contents of the book. The United Nations developed 17 Sustainable Development Goals (SDGs) to promote sustainable development in the global community. During the COVID-19 pandemic, SDG 3: good health and well-being has gained the most concern due to its direct association with public health. Sustainable development is usually reflected in the business industry as environmental, social, and governance (ESG) practice. The public and private sectors in the healthcare industry are both responsible for achieving sustainable development. This book will discuss ESG and sustainable development in healthcare from six perspectives: (i) ESG in the business industry, (ii) the realisation of SDG 3, (iii) value creation of ESG in the healthcare industry, (iv) contemporary development in the business of healthcare, (v) the promotion of ESG to stakeholder groups, and (vi) recent trends in education and research related to ESG and sustainability. This book complements sustainability-related studies and has some highlights that are discussed in the body text.

Keywords

Environmental, social and governance (ESG) • Healthcare • Sustainable development (SD) • Sustainable development goals (SDGs) • Sustainability

This book complements sustainability studies from three perspectives. First, it provides a general review of environmental, social, and governance (ESG) by introducing (i) the development and current situation of sustainability reporting in practice and theory, (ii) ESG promotion strategies to different stakeholder groups, and (iii) latest trends in academic research and education related to ESG and sustainability. Second, this book introduces how the healthcare business and related policies could contribute to sustainable development in universal health and human well-being. Third, the relationship between the healthcare industry and ESG applications with potential impacts is discussed in this book.

Our book has the following highlights. First, this book is the first to introduce the ESG application in healthcare. COVID-19 has brought significant impacts on the environmental, social, and economic sustainability of human society (Ranjbari et al. 2021), and sustainable development in different aspects are interconnected with each other in the post-pandemic time (Shulla et al. 2021). Both private and public sectors, including the healthcare industry, are at the front line to combat the negative impacts of the COVID-19 pandemic (World Economic Forum 2022). Thus, ESG application is critical to the sustainable development of the healthcare industry considering that the COVID-19 pandemic is ongoing. Second, this book is an

up-to-date publication on ESG and sustainable development in healthcare written by academics in business and healthcare. Latest development in regulations and policies related to ESG is introduced. Different chapters in this book discuss the definition of ESG combining practice with theory and how ESG could be materialised in the healthcare industry. Third, this book is a reference for students and practitioners in policy, planning, and developmental positions related to healthcare. The development of healthcare has been accelerated due to economic growth, ageing population, and technology improvement (Fong et al. 2021), and readers could get some related insights from this book.

In 2015, the United Nations introduced the United Nations Sustainable Development Goals (The UN SDGs) in the 2030 Agenda for Sustainable Development. The UN SDGs include 17 goals and 169 targets in total, covering the significant issues in the sustainable development of the economy, environment, and society (United Nations 2015). For example, SDG 3 aims to promote comprehensive healthy lives to human beings of all ages by setting thirteen targets and related indicators. SDG 3.1, 3.2, and 3.3 concern population health and communicable diseases. SDG 3.4, 3.5, 3.6 and 3.10 address non-communicable diseases, mental well-being and behavioural risks. SDG 3.7 and 3.8 focus on reproductive health and universal health coverage, respectively. SDG 3.9 describes the relationship between environment, morbidity, and mortality. SDG 3.11 promotes accessible medicine and vaccines. SDG 3.12 and 3.13 aim to raise awareness to finance health and build health-related capacity globally (Fong et al. 2021; United Nations 2015). SDG 13 addresses climate change issues by intersecting with leading international governance frameworks and treaties, such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement (Charnock and Hoskin 2020; Janetschek et al. 2020). SDG 17 encourages global multistakeholder partnerships to solve sustainability issues (Franco and Abe 2020).

Universal health is compromised by forces from the ageing population, unplanned urbanisation, and the marketing of unhealthy products (Ng et al. 2018). First, with regard to the ageing population, according to the World Health Organization (2022b), the proportion of the population above 60 years old in 2050 will be twice what it was in 2015 globally, increasing from 12 to 22%; and the ageing process is even accelerating now. About 80% of the aged people will live in countries or regions of low or medium income by 2050. A large number of ageing populations imposes a burden on health and social systems; all countries should be ready to face this significant challenge (Fong et al. 2021; World Health Organization 2022b). Second, the fast urbanisation process is likely to change cities into epicentres to transmit diseases, including vector-borne diseases. Based on the data from World Health Organization (2021), over 55% of the global population are urban dwellers, and the proportion will increase to 68% by 2050. About 91% of people living in urban regions breathe polluted air. Accessible and adequate drinking water is not available to about 40% of urban dwellers (World Health Organization 2021). Third, the marketing of unhealthy products affects children's health particularly (Taillie et al. 2019). Specifically, unhealthy food is calorie-dense and nutrient-poor, such as sugary breakfast cereals, fast foods, and soft drinks (Taillie et al. 2019). Unhealthy food marketing will affect children's brand knowledge, dining behaviour, and purchases, leading to potentially unhealthy outcomes, such as obesity and diabetes (Jacobson et al. 2018).

The COVID-19 pandemic slows down the process of achieving universal health. The COVID-19 pandemic broke out in 2020 and has been ongoing since then. Pandemics induce changes in politics, economy, and society; and halt or reverse the progress to achieve long-term sustainability (United Nations 2022). As an infectious disease which poses a significant threat to the public health system, the COVID-19 pandemic is an immediate and particular issue with regard to SDG 3 with the implications for

other SDGs (Seshaiyer and McNeely 2020). According to the United Nations (2022), before the COVID-19 pandemic, SDG 3 gained significant improvement in some aspects, such as (i) reproductive, maternal, and child health; (ii) immunisation coverage; and (iii) infectious disease treatment. However, by the mid of 2022, about 15 million people died due to the COVID-19 pandemic directly or indirectly. Meanwhile, according to the latest data, about 500 million people have been infected by the COVID-19 pandemic (United Nations 2022). Obviously, the outbreak of COVID-19 has brought a significant burden to the health system and disrupted essential healthcare services (Shulla et al. 2021).

Elkington (1998) proposes the triple bottom-line framework to encourage organisations to integrate economic, environmental, and social concerns in sustainability strategies. However, one of the issues that the initial triple bottom-line framework fails to address is the linkage between health and sustainability (Ng et al. 2018). According to Ng et al. (2018), the public sector and the governments cannot act alone to achieve healthy outcomes and realise sustainability in society. As a constituent in the private sector, the healthcare industry is of equal importance in its endeavours. Business enterprises and organisations in the healthcare industry have strategic and economic roles in improving the health of the community they serve and gain benefits (Ng et al. 2018). To form cooperation with the public sector and contribute to health, the private sector should lead the healthcare issues by adapting to related regulations and adjusting business operation strategies (Fong et al. 2021; Ng et al. 2018).

The definition of environmental, social, and governance (ESG) emerges due to prevailing responsible investment (Fonseca 2020). Organisations operate, make decisions, and implement strategies aligned with sustainability initiatives (Cort and Esty 2020). For business entities, corporate sustainability performance and reporting are highlighted by different stakeholder groups, such as investors, creditors, regulators, and the community (Ali et al. 2017). Sustainability reporting provides stakeholder groups, particularly external stakeholders, with corporate

ESG performance and related information to address stakeholders' concerns and meet their expectations (Romero et al. 2019). According to KPMG International (2022), about 96% of the 250 largest global companies issue sustainability reports or ESG disclosure. With regard to the largest 100 companies in each of the 58 countries included in the research sample, about 79% of them reported ESG or sustainability issues in 2022, with a 2% increase from what it was in 2020 (KPMG International 2022).

Initially, ESG disclosure was voluntary to companies. Some companies choose to disclose information on environmental or social performance to create their socially responsible images (Ferdous et al. 2019). Some international organisations release sustainability reporting standards to provide organisations with guidance on reporting ESG issues. The most adopted guidelines are the Global Reporting Initiatives, the UN SDGs, and the Task Force on Climate-related Financial Disclosures (TCFD) (KPMG International 2022). Sustainability reporting regulations from governments and market regulators further institutionalised sustainability reporting practices (Hahn and Kühnen 2013). Although sustainability reporting regulations largely remain voluntary to organisations, regulators in some countries or areas, such as the member countries of the European Union, Singapore, and Hong Kong Special Administrative Region (SAR), have increasingly adopted mandatory sustainability reporting, which is a hybrid form of comply-or-explain provisions and mandatory regulations (Gulenko 2018; Jackson et al. 2020). Similar to financial reporting, sustainability reporting has increasingly highlighted the materiality of ESG information presented in ESG disclosure (Garst et al. 2022; Ruiz-Lozano et al. 2022). ESG disclosure of high quality should be material and decision-useful for stakeholders (Garst et al. 2022), so some regulators and organisations include materiality assessment in sustainability reporting regulations and guidelines (Fiandrino et al. 2022). Besides, climate-related disclosure has been increasingly mandated by some stock exchanges to raise awareness of climate-related risks and opportunities

(Liesen et al. 2015). The Singapore Exchange, for example, propose to implement mandatory climate reporting by 2025 in three steps (Singapore Exchange 2021). In academic research related to ESG disclosure, scholars use different theories, such as agency theory, legitimacy theory, signalling theory, institutional theory, stakeholder theory, and voluntary disclosure theory, to explain the varying motivations and consequences of mandatory and voluntary sustainability reporting (Cho et al. 2015; Hahn and Kühnen 2013).

Despite the annual sustainability reporting, ESG performance should be integrated into daily operations. The healthcare industry generally outperforms other industries with regard to ESG performance due to the relationship between the healthcare industry, socio-economics, and human well-being (Demir and Min 2019; Hensher and McGain 2020).

In the environmental pillar, healthcare waste, energy consumption, and climate change related issues are of primary concern in the healthcare industry. In the context of the COVID-19 pandemic, an enormous quantity of healthcare waste is produced, and much of them is infectious and hazardous. For example, about 3.4 billion masks were used and discarded every day in 2020 (World Health Organization 2022a). The used Polymerase Chain Reaction (PCR) testing cartridges and vaccine needles require appropriate handling and treatment (World Health Organization 2022a). Regarding energy consumption, a reliable, sustainable, and affordable energy source helps improve healthcare service and product quality (Franco et al. 2017). Since hospitals, healthcare facilities, and related research institutions consume energy intensively, sustainable energy management is necessary for both the public sector and the healthcare industry in the private sector (Buonomano et al. 2014). Besides, the negative impacts of climate change should be addressed with joint efforts from every industry. The healthcare industry is responsible for about 4.6% of global greenhouse gas (GHG) emissions (Eckelman et al. 2020) and is supposed to commit to emission reduction to improve universal health (Hensher and McGain 2020).

In the social pillar, (i) product and service quality, (ii) supply chain management, (iii) workplace safety and employee relations, (iv) data privacy and security, and (v) innovation are highlighted in the healthcare industry. While the traditional concern on product, service, supply chain, and safety issues are still focused on by stakeholders (Consolandi et al. 2020), the focus on the appropriate use of data and innovative technologies increases due to the digital transformation of healthcare and the development of advanced information science and technology (Abouelmehdi et al. 2018; Iyengar et al. 2018). Data privacy and security are essential topics under the ESG framework and healthcare information management, particularly important due to the digital transformation of the healthcare system (Zeisel 2020). Innovation in healthcare practice includes three-dimensional (3D) printing, artificial intelligence (AI), virtual reality (VR), healthcare monitoring, and telehealth (Berry 2019; Copeland et al. 2016). These innovations could help improve the efficiency of healthcare services, minimise costs, and lead to healthy outcomes, particularly in the post-pandemic time (Berry 2019; Consolandi et al. 2020).

In the governance pillar, first, board involvement and stakeholder engagement are critical to ESG governance in healthcare companies. The healthcare industry has diverse stakeholder groups, such as patients, healthcare professionals, industry associations, social service organisations, and society (Mehralian et al. 2016). The board of directors is responsible for communicating with stakeholders about their concerns and expectations of firm performance (Lokuwaduge and Heenetigala 2017). Second, as a significant governance issue, anti-corruption practice is particularly highlighted in the healthcare industry (Sommersguter-Reichmann et al. 2018). Healthcare corruption happens in the process of medical service delivery, procurement, and marketing (Kohler and Dimancesco 2020; Sommersguter-Reichmann et al. 2018). Organisations in the healthcare industry should develop a whistle-blowing system to prevent corruption (World Health Organization 2020). Third, tax

management contributes to sustainable development by improving equality and sustainable consumption. The GRI also provides guidelines on tax management (Global Reporting Initiatives 2019). Finally, effective risk and crisis management improve the resilience and adaption to the public health crisis of organisations in the healthcare industry, particularly during the COVID-19 pandemic (World Economic Forum 2022).

Organisations should consider economic performance while implementing ESG strategies (Milne and Gray 2013). ESG alignment stimulates the growth in the revenue of core business operations, reduces operating costs, and attracts potential investment opportunities and asset optimisation (de Jong et al. 2014; McCain 2022). Besides, ESG performance helps organisations address regulatory interventions and gain governmental support. Thus, implementing ESG practice may create value for organisations in the healthcare industry from several aspects.

SDG 17 encourages multistakeholder cooperation to solve sustainability problems (United Nations 2015). As a result, different stakeholder groups should pay joint efforts to promote ESG practice and realise universal sustainability, which is not restricted to the healthcare industry. First, for companies in the healthcare industry, third-party ESG ratings provided by leading rating institutions could assist senior managers and investors in making ESG-related decisions effectively (Dorffleitner et al. 2015). External sustainability assurance adds credibility and accountability to corporate sustainability reports or ESG disclosure, avoiding the problem of greenwashing to some extent (Farooq and de Villiers 2019). ESG-related certifications develop the professional knowledge and application of sustainability management tools (Hörisch et al. 2015), which is critical to promoting ESG strategies in business operations. Second, accounting and finance professionals have a different focus on ESG practice. Topic-specific sustainability reporting and accounting address particular ESG issues, such as biodiversity loss, carbon emission, and materiality assessment (Blanco-Zaitegi et al. 2022; KPMG International

2022; Mateo-Márquez et al. 2020). ESG financial products provided by various financial institutions contribute to the prevailing responsible investment and a sustainable financial market (Tolliver et al. 2019). Financial technology is induced by the development of computer science and information technology; and improves the efficiency in the decision-making process related to ESG (KPMG International 2021). Third, for community constituents, sustainability is promoted in different ways. Higher education institutions (HEIs) align governance and teaching methods with ESG, construct green campus buildings, issue annual sustainability reports, join in international declarations, and introduces third-party ESG performance rankings to improve HEIs' competitiveness with regard to overall sustainability (Dagiliūtė et al. 2018; Khan and Henderson 2020; Lauder et al. 2015; Sassen and Azizi 2018; Žalėnienė and Pereira 2021). Small and medium-sized enterprises (SMEs) could develop new sustainable business models, adopt the latest innovation and technology, and utilise supportive policy frameworks to promote ESG practice which is different from large corporations and multinational corporations (MNCs) (Dey et al. 2018; Koirala 2018; Oduro et al. 2021). Besides, non-governmental organisations (NGOs) publicise sustainability by focusing on specific topics of ESG, such as natural habitat preservation, anti-corruption, and sustainable investment (Arenas et al. 2009; Koshy 2022; United Nations 2015).

Academic research and professional education contribute to the promotion of ESG and sustainable development. First, the literature provides evidence that ESG alignment is likely to bring companies positive outcomes, such as increased firm value, reduced cost of capital, low firm risks, and socially responsible corporate images (Arif et al. 2022; D'Amato and Falivena 2020; Fan et al. 2021; Tamimi and Sebastianelli 2017). Second, some scholars evaluate corporate ESG performance with ESG scores and ratings provided by dominating ESG rating institutions, such as Thomson Reuters ASSET4, Bloomberg, and MSCI KLD databases (Drempetic et al. 2020; Hong and Andersen 2011; Husted and

Sousa-Filho 2019; Minutolo et al. 2019). Third, the ESG indices and scoring system developed from content analysis are widely adopted to assess ESG performance and ESG disclosure quality (Al-Shaer 2020; Romolini et al. 2014; Tsalis et al. 2020). Fourth, business sustainability education is discussed in academic research (Rezaee and Homayoun 2014).

This book is structured as follows. First, after this brief introduction, Chapter 2 provides a general review of sustainability reporting. International sustainability reporting standards and regional regulations on ESG disclosure in Western and Asian countries are introduced. Common theories adopted in academic research on sustainability reporting are included, including agency theory, legitimacy theory, signalling theory, institutional theory, stakeholder theory, and voluntary disclosure theory. Second, Chapter 3 illustrates how targets under the SDG 3 are realised in both the public and the private sector in the healthcare industry to guarantee human well-being. Each target is related to one or more healthcare issues. Recent issues related to the COVID-19 outbreak in public health practices are discussed. Third, Chapter 4 introduces the ESG application in the sustainable development of the healthcare industry from the environmental, social, and governance perspectives. Despite common ESG issues, Chapter 4 also includes the value creation of ESG in the healthcare industry. Fourth, Chapter 5 discusses how the development in the healthcare business is driven by economic growth, ageing population, and technological advancement, and the issues in new directions of conducting the business in healthcare and examine how practices can affect sustainable development in health and wellness. Fifth, Chapter 6 depicts the promotion of ESG to different stakeholder groups, including healthcare practitioners, companies in the healthcare industry, accounting and finance professionals, and constituents in communities, such as higher education institutions, small and medium-sized enterprises (SMEs), and non-governmental organisations (NGOs). Sixth, Chapter 7 introduces the recent development in academic research and education in the ESG and

sustainability domains. Literature provides evidence that (i) sustainability alignment and ESG practice bring competitive advantages for companies; (ii) ESG scores are widely adopted in academic research to evaluate ESG performance; and (iii) further education about ESG and sustainability in strategic management is increasingly included in the business curriculum. Some concluding remarks are made in each chapter.

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Environmental, Social, and Governance (ESG) in the Business Industry

2

Abstract

Environmental, social, and governance (ESG) has been prevalent over the past two decades and is a relatively new concept for investors and companies. Investors and companies increasingly prioritise ESG in their decision-making due to responsible investment and the growing social and environmental problems, such as modern slavery, unsustainable consumption, and climate change. Policymakers and regulators developed related policies and regulations to assist local companies align with ESG initiatives. The development of ESG practice in Asia is still at the initial stage compared to Western countries. Asian countries show different levels of ESG implementation due to heterogeneous institutional backgrounds. The policymakers, market regulators, and listed companies have taken a series of measures to incorporate ESG into corporate strategies, such as voluntary or mandatory ESG reporting standards, to create a transparent, accountable, and favourable market with low risk for different stakeholders. A number of theories are adopted to explain the motivations of ESG reporting. This chapter will provide a general overview of how ESG originated and evolved in investment decisions, introduce particular well-adopted global ESG reporting standards, and how regional regulators and listed companies in response to this global trend.

Keywords

Environmental social and governance (ESG) • Sustainability • Materiality • Task force on climate-related financial disclosures (TCFD) • Global reporting initiatives (GRI)

2.1 Introduction

The 2030 Agenda for Sustainable Development (the 2030 Agenda) appeals for global cooperation in realising the sustainable development of human society. In particular, SDG 12 encourages companies to publish sustainability reports to show their social responsibilities (United Nations 2015).

Responsible investment responds to the concern on environmental, social, and governance (ESG) (Alda 2021; Principles for Responsible Investment 2020). Investors evaluate companies' ESG performance when making investment decisions. Accordingly, companies fully engaging with ESG tend to have good financial performance (Alda 2021; Amel-Zadeh and Serafeim 2018; Aouadi and Marsat 2018). Sustainability reporting is a widely adopted method to demonstrate companies' ESG concerns in sustainability reports (Lokuwaduge and Heenetigala 2017). Despite business self-regulation, local government and market regulators contribute to a certain degree of mandatory or voluntary ESG

disclosure (Jackson et al. 2020; Lokuwaduge and Heenetigala 2017).

Some organisations establish relevant international ESG reporting standards, such as the Global Reporting Initiatives (GRI), Carbon Disclosure Project (CDP), Sustainability Accounting Standards Board (SASB), the UN SDGs, and the Task Force on Climate-related Financial Disclosures (TCFD), to improve ESG reporting quality and increase the comparability and usefulness of ESG information. In some jurisdictions, governments and market regulators release reporting regulations and guidelines to standardise sustainability reporting practices and improve reporting quality. Prior research has used several theories to explain the motivations of sustainability reporting, while contemporary theories and interdisciplinary theories have been adopted to explain ESG phenomena.

This chapter is structured as follows. After this brief introduction, the following section presents the evolution of sustainability reporting. Second, certain well-adopted global ESG reporting standards are introduced. Third, regional ESG reporting regulations and guidelines are presented for countries or regions. Fourth, some ESG-related theories are presented. Finally, concluding remarks are presented in the last section.

2.2 Evolution of Sustainability Reporting

Table 2.1 presents the timeline of sustainability reporting. A low confidence level in businesses' socially responsible performance induced the introduction of social reporting (Latapí et al. 2019). In the 1970s, corporate accountability first came about in the form of social reports in the United States, the United Kingdom, and Western European countries. These social reports reflect companies' social and environmental impacts (Kolk 2010). In 1971, the Committee for Economic Development (CED) in the United States issued two publications: (i) Social Responsibilities of Business Corporations and (ii) A New Rationale for Corporate Social Policy (Community Economic Development 1971a, b).

The first publication explores the latest expectations for the business entities in society, while the second discusses how organisations can legitimise themselves when they are involved in social problems (Latapí et al. 2019). The CED assumes a social contract between business and society (Community Economic Development 1971a). The definition of corporate social responsibility (CSR) was unclear until Carroll (1979) proposed that a CSR framework arises from the economic, legal, ethical, and philanthropic dimensions of organisations in society.

Environmental reporting emerged as a major trend in the early 1980s (Larrinaga and Bebbington 2021), when businesses appeared to be paying little attention to social reporting (Dierkes and Antal 1986; Kolk 2010). However, non-financial reporting appeared again particularly focusing on environmental disclosure in the late 1980s (Kolk 2010; Larrinaga and Bebbington 2021). In 1989, an environmental accident, the Exxon Valdez oil spill, provided an example of an unforeseen incident that caused the company to repair its legitimacy by increasing environmental disclosures in its annual reports (O'Donovan 2002). In Europe, the European Union (EU) required companies to publish annual reports with environmental disclosure (European Union 1993). The EU later mandated large industrial companies to issue annual environmental statements and conduct environmental audits verified by independent third parties (Bade 1991). At this stage, listed companies used CSR reports to meet stakeholder expectations to regain their trust (Shabana et al. 2017). The Coalition for Environmentally Responsible Economies (CERES) was founded by investors and environmentalists to evaluate corporate CSR performance based on environmental, economic, and social change, subsequently introducing related corporate reporting guidelines, including the Global Reporting Initiatives (GRI) (Lubber 2019).

Sustainability reporting emerged in the 2000s due to globalisation and sustainable development at the global level (Larrinaga and Bebbington 2021; Latapí et al. 2019). However, some industrial companies simply shifted from social and environmental reporting to sustainability

Table 2.1 Timeline of sustainability reporting

Time	Phase	Event
1970s	Social reporting	Two publications from the Committee for Economic Development (CED)
1980s	Environmental reporting	Exxon Valdez oil spill
		The Coalition for Environmentally Responsible Economies (CERES)
1990s	Sustainability reporting	The Global Reporting Initiatives (GRI)
		The Triple Bottom Line (TBL)
2000s		The United Nations Global Compact (UNGC)
		The Who Care Wins conference
		The Sustainable Stock Exchanges Initiative
2010s		Carbon Disclosure Project (CDP), Sustainability Accounting Standards Board (SASB) Framework, and Task Force on Climate-related Financial Disclosures (TCFD)

Source From the author's research

reporting (Kolk 2003). Thus, sustainability reporting at this stage could be seen as a transformation of social and environmental reporting rather than a completely new concept (Larrinaga and Bebbington 2021). In 1997, the GRI Standards were co-established by the United Nations Environment Programme (UNEP) and CERES with a predominate focus on environmental aspects and the first international standard for sustainability reporting at that time (Lubber 2019; Global Reporting Initiative 2021).

The theoretical framework of CSR was prevalent in the 1990s. Carroll (1991) proposed a pyramid of CSR, providing insights for executives to balance commitments among various stakeholder groups. The pyramid of CSR consists of four main responsibilities: (i) economic, fulfilling the basic responsibility to make profits; (ii) legal, requiring business entities to obey all related regulations; (iii) ethical, shaping companies' behaviour beyond the legally binding duties; and (iv) philanthropic, contributing to community involvement (Carroll 1991). Elkington (1998) developed the triple bottom line (TBL) to explain three aspects: economy, society, and environment. A company achieves TBL performance by collaborating with public and private sectors in the long term. Companies must achieve economic goals by balancing social and environmental performance (Elkington 1998).

In 2000, the United Nations Global Compact (UNGC) was founded to promote companies to

integrate concerns on environmental and social issues into strategies and operations (Haque and Ntim 2018; United Nations Global Compact 2022). Like the GRI, the UNGC is a corporate sustainability initiative that aims to advance CSR performance and sustainability reporting transparency (Haque and Ntim 2018).

The term 'ESG' was not prevalent until 2005, when the Who Cares Wins conference engaged institutional investors, financial analysts, regulators, and other related parties to discuss ESG integration in financial evaluations of companies (Kolk and Perego 2010). The Sustainable Stock Exchanges Initiative (SSEI) was founded by the United Nations Conference on Trade and Development (UNCTD), the UNGC, the UNEP Financial Initiative, and the United Nations Principles for Responsible Investment (UNPRI). The SSEI aims to promote responsible investment and sustainability reporting among global stock exchanges and markets (McBrayer 2018; Sustainable Stock Exchanges 2019).

In recent decades, sustainability reporting has been well established, becoming specific after some critical global sustainability events, such as the 2030 Agenda for Sustainable Development, the Paris Agreement, and the Glasgow Climate Pact (Dagilene et al. 2020). ESG reporting is standardised by reporting guidelines such as the GRI, Carbon Disclosure Project (CDP), and the Sustainability Accounting Standards Board (SASB) framework. Some regional stock

exchanges also provide ESG reporting regulations and guidelines to help listed companies report their ESG information (Sustainable Stock Exchanges 2019).

material topics, providing organisations with detailed guidance on reporting the most significant issues in sustainability disclosures (Global Reporting Initiative 2021).

2.3 Global ESG Reporting Standards and Frameworks

2.3.1 The Global Reporting Initiative (GRI)

The GRI is the first voluntary reporting standards for sustainability reporting worldwide; it was jointly launched in 1997 by the Organisation for Economic Co-operation and Development (OECD), the International Organization for Standardization (ISO), UNEP, and UNGC. The GRI acts as a normative reporting requirement and affects the reporting rate and quality of ESG disclosures in some areas, encouraging organisations to engage in social and environmental performance management (Comyns 2016; Haque and Ntim 2018). The GRI Sustainability Reporting Standards (the GRI Standards) were released in 2016 and became the most-adopted sustainability reporting framework among global and national companies (KPMG International 2020). The scope of the GRI Standards covers various topics regarding economic, social, and environmental performance based on consultation with different stakeholder groups. The GRI Standards adopt a materiality matrix to visualise the material ESG topics for an organisation and its stakeholders (Global Reporting Initiative 2016).

Since the first release in 2016, the three main topics of (i) water and effluents, (ii) waste, and (iii) tax have been updated or added to align with the latest global ESG focuses. The GRI 304: Biodiversity is now under review and the revised standards are expected to be released in 2023 (Global Reporting Initiative 2023). In 2021, the GRI Standards proposed adding sector-specific guidelines to help organisations determine and report their material ESG issues, with the first sector-specific standards instituted for the oil and gas sector. Material assessments became a separate set of standards as GRI 3

2.3.2 The Carbon Disclosure Project (CDP)

British institutional investors launched the CDP in 2000, initially aiming to investigate how companies respond to climate change, emission management, and environmental accounting (Li et al. 2018). After two decades, regional offices and partners of the CDP span 50 countries, and organisations in more than 90 countries disclose related information based on the CDP. There are three primary focuses of CDP—climate change, water, and forests—and they are all critical to the global economy, human survival, and environmental sustainability (Carbon Disclosure Project 2012). The CDP employs standards at the city and corporate levels, avoids data manipulation to a large extent, and collects environmental data from organisations, such as carbon emissions, energy use, and water security (Fan et al. 2021). After data collection, the CDP evaluates organisations' environmental performance with a scoring system on an annual basis. The CDP facilitates communication between investors and companies by publishing the results and receiving positive feedback from major investment banks and pension funds (Saka and Oshika 2014). Since adopting an acknowledged environmental management system sometimes indicates how a company contributes to address environmental risks, the CDP can be a significant and reliable source of information on risk management related to climate change and carbon emissions (Jung et al. 2018).

2.3.3 The Sustainability Accounting Standards Board (SASB)

The SASB was established in 2011 and is currently maintained by the Value Reporting Foundation (VRF) (IFRS Foundation 2022). The SASB

develops its ESG reporting standards (the SASB Standards) and leverages financial materiality which evaluates material information based on its contribution to financial performance (Jebe 2019). The GRI Standards focus on the impacts of business operations on sustainable development, whereas SASB Standards explore the impacts of sustainability issues on businesses (Eng et al. 2022). SASB suggests that ESG disclosures should be financially material and sector specific to businesses in a cost-effective and decision-useful way (IFRS Foundation 2022). SASB Standards are related to corporate financial conditions, such as assets, liabilities, revenue, and costs, and they consist of reporting guidelines from 77 industries, prioritising different ESG aspects (IFRS Foundation 2022). The SASB Standards mainly provide transparent and standardised ESG information to large institutional investors and financial analysts (Ailman et al. 2017).

2.3.4 The United Nations Sustainable Development Goals (UN SDGs)

The UN SDGs highlight the most urgent problems regarding sustainability of the economy, society, and environment, representing a long-term vision and a concrete blueprint for the prosperity of human beings (Rosati and Faria 2019). In particular, SDG 1 aims to eradicate poverty globally, while SDG 8 promotes economic growth. SDG 13 focuses on climate change, which causes physical and transitional risks to human society and business operations (United Nations 2015).

Organisations can accelerate their realisation of the 2030 Agenda and solve unsustainable development problems by integrating SDGs into their operations and strategies (United Nations Global Compact 2018). ESG disclosures together with SDGs may provide companies with investment opportunities due to some ESG financial products (Consolandi et al. 2020). In addition, SDG 12—Responsible Consumption and Production states

that companies are highly encouraged to issue sustainability disclosures to engage in responsible management (United Nations 2015). Despite the proactive efforts of companies, government and regulators are critical to promoting and guiding SDG alignment (Sachs et al. 2019). Some countries and regions have already established regional planning catering to the 2030 Agenda, for example China, Singapore, and the European countries.

2.3.5 The Task Force on Climate-Related Financial Disclosures (TCFD)

The Financial Stability Board (FSB) established the TCFD in 2015 to help companies report financial consequences related to climate risks and opportunities (O'Dwyer and Unerman 2020; Wedari et al. 2021). The TCFD recommendations were released in 2017 to make climate-related disclosures comprehensive, consistent, and comparable and to visualise how organisations address climate risks and opportunities (De Bernardi et al. 2019).

The TCFD recommendations are structured into four major areas: (i) governance, which requires active board and senior management involvement; (ii) strategy in various climate-related scenarios in the short, medium, and long term; (iii) risk management which is adequate to identify climate-related risks and opportunities; and (iv) matrices and targets to evaluate and cope with climate change issues (O'Dwyer and Unerman 2020). Companies are encouraged to conduct scenario analyses to evaluate risks and opportunities arising from climate change. Since climate change is a common concern globally and prioritised by investors (Lombardi et al. 2022), some regional stock exchanges, such as the Singapore Exchange Limited (SGX) and the Hong Kong Stock Exchanges (HKSE), release ESG reporting guidelines based on the TCFD framework and propose to require listed companies to issue mandatory climate disclosures.

2.4 ESG Reporting Regulations and Guidelines in Western Countries

Table 2.2 shows ESG reporting regulations in the United Kingdom (UK), Spain, the United States (U.S.), and Australia.

2.4.1 The United Kingdom

The Company Act 2006 in the UK requires companies to disclose ESG information, such as scope-1 and scope-2 emissions. The UK Listing Rules mandate all listed companies to issue ESG disclosures based on the TCFD recommendations (Financial Conduct Authority 2022). Listed companies in the UK must attach statements in annual financial reports explaining whether they align with the TCFD standards (Financial Conduct Authority 2022). In 2021, the UK government proposed mandatory climate-related financial disclosures for public companies, large private companies, and limited liability partnerships (LLPs), showing the UK's determination and leading role in realising net-zero goals (Department for BEIS 2021).

The London Stock Exchange Group (LSEG) announced and revised Revealing the Full Picture: Your Guide to ESG Reporting (the LSEG Guide) in 2017 and 2020. The LSEG suggests that listed companies focus on ESG information

innovation and relevance at this stage (London Stock Exchange Group 2020). The LSEG Guide prioritises eight aspects of ESG reporting: (i) strategic relevance, (ii) investor materiality, (iii) investment-grade data, (iv) global frameworks, (v) reporting formats, (vi) regulation and investor communication, (vii) green revenue reporting, and (viii) debt finance. Materiality refers to information in ESG disclosures that needs to be integral to investors' decisions based on the LSEG Guide (London Stock Exchange Group 2020). Investment-grade data means that high-quality ESG data must be provided in the ESG reports; the data should be accurate, comparable, balanced, consistent, and prepared on time (Fernandez-Feijoo et al. 2014; Global Reporting Initiative 2021). Investors are paying more attention to the environmental pillar of ESG due to the promotion of green finance (Tolliver et al. 2019). However, greenwashing sometimes occurs, leading to failure to integrate ESG considerations into investment decisions with the information provided in ESG disclosures (Dahlmann et al. 2019; Yu et al. 2020).

2.4.2 Spain

Spain, as an EU member state, has adopted Directive 2014/95/EU in sustainability reporting. Directive 2014/95/EU amends Accounting Directive 2013/34/EU by regulating non-financial

Table 2.2 ESG reporting regulations in the UK, Spain, the US, and Australia

		UK	Spain	The U.S	Australia
Regulations	Scope	Comprehensive	Comprehensive	Certain aspects	
	ESG disclosures	Required		Not required	
	Obligation level	Mandatory	Mandatory	Voluntary	Voluntary
Reporting guidelines	Releasing time	2017	2017	2017	2011
	Last revision	2020	2017	2019	2015
	Materiality	Investor	Stakeholder	Investor	Investor
	Link to global ESG guidelines	Yes	Yes	Yes	Yes
	TCFD alignment	Yes	Yes	No	Yes

Source From the author's research

reporting practice in the EU. Directive 2014/95/EU mandates large public-interest entities (PIEs) and organisations to issue non-financial disclosures on specific environmental and social issues, such as environmental protection, labour practice, and anti-corruption (European Union 2014; Pizzi et al. 2021a, b).

In June 2017, the European Commission (EC) published guidelines on non-financial reporting (the EU Guidelines) to help large PIEs align with Directive 2014/95/EU without legal obligation. The EU Guidelines suggest that materiality should be assessed based on communication with various stakeholder groups, seeking a comprehensive understanding of their concerns and interests in a particular context (European Union 2017). Under Directive 2014/95/EU, mandatory reporting provisions cover a wide range of sustainability issues of variable materiality, and some companies show a tick-the-box attitude when compiling ESG reports rather than selecting the most material issues for stakeholders (Liu et al. 2019; Matuszak and Róžańska 2021). Kindly note that the citation of Pizzi et al. (2021) has been changed to Pizzi et al. (2021a, b) by matching the reference list. Please check and confirm. Thank you. We have confirmed.

In June 2019, the EC released guidelines on climate-related reporting (the EU Climate Reporting Guide) based on the TCFD recommendations and supplements to the EU Guidelines (European Union 2019). The EU Climate Reporting Guide was put forward due to the EU's dedicated commitment to the Paris Agreement to reduce greenhouse gas (GHG) emissions and address climate change, and it targets realising the UN SDGs before 2030 (European Union 2019; United Nations 2015). As suggested by the TCFD, integrating climate-related issues in ESG disclosures may help companies and investors to understand climate-related risks and opportunities (Depoers et al. 2016).

In April 2021, the EC proposed the Corporate Sustainability Reporting Directive (CSRD), which would amend Directive 2014/95/EU. The CSRD proposal enlarges the number of target companies, including all large and listed

companies except small enterprises. Thus, companies must adopt the independent external assurance of sustainability reports with at least partial assurance. The CSRD requires that all information be published as part of the corporate management report and specifies the delivery format of sustainability reports (European Union 2021).

2.4.3 The United States

There are no mandatory ESG disclosure requirements at the federal level in the US; however, some U.S. states have established regulations on ESG reporting. For example, in 2021, the California Senate passed two bills to mandate that certain companies report GHG emissions and climate-related risks (Matos 2020). In the same year, the Governor of Washington signed Senate Bill 5126, the Climate Commitment Act (CCA), to accelerate the transition to a low-carbon economy through climate legislation (Department of Ecology 2022).

In 2010, the U.S. Securities and Exchange Commission (SEC) required listed companies to include ESG issues in their 10-K filings or annual proxy statements; it provides interpretive guidance on disclosures related to climate change (the 2010 Guidance), including the impacts of climate-related regulations on business operations and the physical impacts of climate change (Securities and Exchange Commission 2010). In 2021, the SEC proposed to enlarge the scope of the 2010 Guidance, requiring disclosures on every aspect of ESG, including climate risks, employment diversity, and cybersecurity risks (Securities and Exchange Commission 2021).

The National Association of Securities Dealers Automated Quotations (Nasdaq), leading stock exchange in the United States, released a voluntary ESG reporting guide for listed companies to integrate ESG concerns in annual reports or standalone sustainability reports. Nasdaq introduced a voluntary investor-based ESG reporting guide initially for its Nordic and Baltic markets in 2017 and revised the ESG reporting guide (the Nasdaq Guide) in 2019, making it

applicable for all private and public companies (Nasdaq 2019). The Nasdaq Guide closely aligns with the UN SDGs and prioritises (i) SDG 5—gender equality, (ii) SDG 12—responsible consumption and production, (iii) SDG 13—climate action, and (iv) SDG 17—partnerships for the goals (Nasdaq 2019).

2.4.4 Australia

Similarly, sustainability reporting in Australia is voluntary, but there are some regulations on disclosing certain ESG aspects. The Corporations Act 2001 requires issuers to provide financial products that disclose how they have integrated environmental consideration in investing decisions (Federal Register of Legislation 2001). The updated Corporate Governance Principles and Recommendations require listed companies to report significant economic, social, and environmental risks and the methods used to deal with such risks (Australian Council of Superannuation Investors 2015).

To improve ESG reporting performance in the local market and address institutional investors' expectations, the Australian Council of Superannuation Investors (ACSI) and Financial Service Council (FSC) jointly published and revised the ESG reporting guide (the ASX Guide) for Australian Companies in 2011 and 2015, respectively (Australian Council of Superannuation Investors 2015). To ensure the usefulness of ESG disclosures to investors, the ASX Guide suggests that listed companies refer to the GRI to conduct materiality assessments and encourages issuers to seek both internal and external assurance on ESG disclosures.

In 2021, the Australian Prudential Regulation Authority (APRA) released a consultation paper, the Prudential Practice Guide on Climate Change Financial Risks (the APRA Guide), based on the TCFD recommendations and APRA's analysis of local ESG reporting practices. The APRA Guide focuses on financial risks due to climate change, complementary to APRA's risk management and governance regulations (Australian Prudential Regulation Authority 2021).

However, according to PwC's report (2021a), more than 80% of the listed companies in Australia neither disclosed material ESG risks nor realised the connection between ESG risks and financial performance. PwC (2021a) suggests that listed companies strengthen their ESG governance structure to prepare more stringent regulations in the future.

2.5 ESG Reporting Regulations and Guidelines in Asian Countries

Asia is accelerating the promotion of sustainability reporting, and regulatory development contributes to this progress (PwC 2020). Some countries in Asia have local ESG reporting regulations and guidelines. Table 2.3 provides a brief description of these ESG reporting regulations and guidelines in various Asian countries.

2.5.1 China Mainland

China faces environmental and social problems while experiencing significant industrial development and economic growth (Leung 2021); it prioritised the implementation of the 2030 Agenda and aligned the UN SDGs with its national planning in its 13th five-year plan (FYP). The 14th FYP highlights climate and environmental performance, such as energy consumption, GHG emission intensity, and carbon neutrality (PwC 2020; United Nations Development Programme 2021). At the corporate level, there is increasing demand for accountable, transparent, and socially responsible performance to attain sustainability in China's rapid economic growth, and corporate social disclosure is an effective method (Noronha 2015; Noronha et al. 2015). In China, regulations and government pressure are the main drivers for mandatory and voluntary CSR reporting (Yu and Rowe 2017).

In China, the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE) have developed some indices to promote CSR in

Table 2.3 ESG reporting regulations and guidelines in Asia

		China Mainland		Hong Kong SAR	Singapore	Malaysia	Japan
		SSE	SZSE				
Regulations	ESG reporting	Partly Required		Required			Not required
	Obligation level	Partly Mandatory		Comply-or-explain		Mandatory	Voluntary
Reporting guidelines	Releasing time	2008	2006	2013	2016	2015	2020
	Last revision	N/A		2021	2022	2018	N/A
	TCFD alignment	No		Yes	Yes	Yes	Yes

Source From the author's research

listed companies, for example, the SSE Corporate Governance Index, SSE Sustainable Development Industry Index, and SZSE SME CSR Index. SSE and SZSE have reporting requirements focusing on listed companies' environmental or overall CSR performance. SZSE released the SZSE Social Responsibility Guidelines for Listed Companies (the SZSE Guideline) in 2006, mandating that companies publish CSR reports. SSE issued Guidelines on Environmental Information Disclosure in 2008 and mandated three kinds of public companies to report CSR information annually: (i) constituents of the Corporate Governance Index, (ii) cross-listing companies, and (iii) listed financial companies. At the same time, SZSE required constituent companies of the SZSE 100 Index to issue CSR disclosures as required by the SZSE Guidelines (Leung 2021; Shen et al. 2020).

The State-Owned Assets Supervision and Administration Commission of the State Council (SASAC) has had mandatory CSR reporting rules for all state-owned enterprises (SOEs) since 2011. In China, SOEs act as a medium of social and economic policy, and governments expect SOEs to contribute to solving social and environmental problems (Ervits 2021). In 2018, the China Securities Regulatory Commission (CSRC) revised the Corporate Governance for Listed Companies to a standardised CSR reporting framework and format, adding comparability to CSR performance in China (PwC 2020).

According to PingAn's (2020) report, Chinese enterprises lack sufficient government guidance and professional ESG knowledge for good ESG performance and high-quality ESG data. Knowledge and sustainability management tools are critical in ESG governance and strategies (Hörisch et al. 2015). Listed companies can promote sustainability management by various methods, such as leveraging a technological approach (Hörisch et al. 2015; PingAn 2020). For example, artificial intelligence (AI) technologies can be applied to streamline and simplify the ESG reporting process by automatic data collection and standardised process and to develop a sustainable business model (Di Vaio et al. 2020; PingAn 2020).

2.5.2 Hong Kong SAR

Cap. 622 of the Companies Ordinance (the new CO) in Hong Kong Special Administrative Region (SAR) took effect in March 2014, mandating all incorporated Hong Kong companies to include (i) environmental policies and performance, (ii) compliance with regulations and laws, and (iii) relationship with employees, customers, and suppliers in annual directors' reports (Hong Kong e-Legislation 2021).

The Hong Kong Exchanges and Clearing Limited (HKEX), as the market regulator in Hong Kong SAR, released the first ESG reporting guide in 2013 and appended it to the main

board listing rules as Appendix 27 of the Environmental, Social, and Governance Reporting Guide (the HKEX Guide) and Appendix 16 of the Growth Enterprise Market (GEM) (Hong Kong Exchanges and Clearing Limited 2021). The HKEX Guide underwent three revisions in 2016, 2019, and 2021. The latest HKEX Guide involves (i) mandatory disclosure requirements on ESG governance, reporting principles, and boundaries and (ii) comply-or-explain reporting provisions regarding environmental and social areas. Each involves general disclosures, major aspects, and key performance indicators (KPIs) (Hong Kong Exchanges and Clearing Limited 2021).

In January 2016, the HKEX announced Update No. 115, raising the obligation level of general disclosures of both subjects and KPIs under the environmental subject from voluntary to comply-or-explain (Hong Kong Exchanges and Clearing Limited 2021). The comply-or-explain framework allows listed companies to report ESG issues based on companies' and stakeholders' priorities, while full compliance with the HKEX Guide is not mandatory. However, issuers need to explain their degree of compliance (Andres and Theissen 2008; Pizzi et al. 2021a, b). In December 2019, the second update contained four major changes to the HKEX Guide. First, mandatory reporting provisions were added. Second, the obligation level of KPIs in the social area was raised to comply-or-explain. Third, the HKEX Guide added aspects on climate change and amended some existing environmental KPIs. Fourth, the timing to issue ESG disclosures was set to five months after the financial year (FY) ends (Hong Kong Exchanges and Clearing Limited 2021; Leung and You 2023b). In December 2021, the third update further shortened the release time of ESG disclosures. Issuers must simultaneously publish ESG disclosures and annual reports (Hong Kong Exchanges and Clearing Limited 2021). To respond to the increasing demand for ESG data from investors and raise listed companies' awareness of ESG reporting, the HKEX released a voluntary reporting guideline to help issuers prepare ESG disclosures (Hong Kong Exchanges

and Clearing Limited 2020). Specifically, the reporting guide focuses on climate change and some social issues (Leung and You 2023a).

The COVID-19 pandemic along with other existential sustainability challenges, such as climate change pose potential risks to corporate ESG performance and stability of the financial system (Adams and Abhayawansa 2022; Cho et al. 2022). Some listed companies identify COVID-19 as a significant risk in ESG disclosures. PwC (2021b) suggests that Hong Kong's listed companies enhance disclosure of public health and occupational safety measures if they are in the properties, transportation, or food processing industries in which the viral transmission risk is increasing. In the post-COVID-19 pandemic, companies with strong ESG strategies are more preferable for investors (Mio 2020; Ng and Leung 2020). Thus, Hong Kong's listed companies could consider allocating their resources to build sustainability in both the short and long term. For example, companies may enhance board involvement to evaluate material ESG risks.

2.5.3 Singapore

In July 2016, the Singapore Exchange (SGX) announced Listing Rule 711A, which states that all listed companies must prepare annual sustainability disclosures five months after the end of the financial year. The timing was shortened to four months for ESG disclosures without external assurance in January 2022 (Singapore Exchange 2022). Listing Rule 711B requires that ESG disclosures adopt the comply-or-explain framework and contain the following information: (i) material ESG topics; (ii) ESG-related policies and performance; (iii) target setting; (iv) the framework of sustainability reporting; and (v) board statement (Singapore Exchange 2022). In 2022, the SGX amended Listing Rule 711B to require issuers to disclose climate-related issues aligned with the TCFD recommendations. Additionally, the sustainability governance structure must be included in the board statement (Singapore Exchange 2022).

The SGX added the Sustainability Reporting Guide (the SGX Guide) as Practice Note 7.6 to the listing rules of SGX in 2016 and amended it in 2020 and 2022 (Singapore Exchange 2022). In the latest version of the SGX Guide, mandatory climate reporting will be gradually promoted due to severe climate change problems and global climate reporting trends (Singapore Exchange 2022). The process will go through three phases. First, climate reporting will be mandatory for all listed issuers based on the comply-or-explain framework by 2023. Second, by 2024, climate-related reporting will remain at the comply-or-explain level for issuers, except for those in (i) financial; (ii) agriculture, food, and forest products; and (iii) the energy industry. Third, by 2025, in addition to the industries mentioned above, climate reporting will be mandatory for the materials and buildings and transportation industry. The SGX provides core ESG metrics for issuers to assess or review (Singapore Exchange 2021).

Both the HKEX and the SGX apply the comply-or-explain principle to ESG reporting guidelines that conform to international norms and reporting standards, such as the GRI and the TCFD (Liu et al. 2019). Table 2.4 shows the comparison of ESG topics in the HKEX Guide and the SGX Guide with the GRI and the TCFD.

Almost 99% of listed companies in Singapore adopted the GRI standard in 2020 (Singapore Exchange 2021), whereas only about 10% of listed companies in Hong Kong adopted the GRI standard in 2020 (BDO Hong Kong 2021).

The ESG reporting rate in the SGX is relatively high. According to Singapore Exchange's (2021) review, 99.8% of the sample issuers submitted ESG reports in 2019, and the ESG reporting rate was 99.5% in 2021, remaining at a high level. Meanwhile, the ESG reporting quality improved. The listed companies reported a 5% increase in their materiality assessment process and stakeholder engagement (Singapore Exchange 2021). In 2021, the most concerning ESG topics were energy, occupational health, and anti-corruption. Nearly 60% of the sample companies prioritised economic performance in their material topics. Similar to the HKEX Guide, the SGX Guide recommends that listed companies seek independent assurance regarding sustainability reports, but only 3% of listed companies in Singapore did so in 2019. The independent assurance rate was the same for listed Hong Kong companies in 2019 (BDO Hong Kong 2021; Singapore Exchange 2021). Notably, 61.3% of listed companies include COVID-19 issues in their ESG disclosures as they are considered an economic and social

Table 2.4 Comparison of ESG topics in the HKEX guide and the SGX guide

Aspects	ESG topics in the HKEX Guide and the SGX Guide	GRI	TCFD
Environmental	GHG emission type and intensity	GRI 103-2, GRI 305	Metrics and targets
	Waste management	GRI 103-2; GRI 306-2, 3, 4	—
	Energy consumption	GRI 302	—
	Climate risk management	GRI 201-2	Strategy; Metrics and targets
Social	Occupational health	GRI 103-2, 403, 419–1	—
	Employee development	GRI 404-1	—
	Diversity	GRI 401-1, 405-1	—
Governance	Anti-corruption practice	GRI 205-1, 2, 3	—
	Anti-corruption training	GRI 205-2	—

Source From the author's research

factor by the SGX (Singapore Exchange 2021). The Singapore Exchange (2020) suggests that issuers shift to a risk-based reporting regime and focus particularly on social issues, such as health and safety of employees, community involvement, and supplier risk management.

2.5.4 Japan

The Ministry of Trade, Economy, and Industry (MTEI) in Japan released (i) Guidance for Integrated Corporate Disclosure and Company-Investor Dialogues for Collaborative Value Creation (Guidance for Collaborative Value Creation) in 2017 and (ii) Guidance on Climate-Related Financial Disclosures (Japan TCFD Guidance) in 2018 (Japan Exchange Group 2020). MTEI released the Guidance for Collaborative Value Creation for two reasons. First, the Japan Revitalization Strategy 2016 pursues corporate governance reform as a priority by promoting sustainable development in corporate value and long-term investment. Second, the Guidance for Collaborative Value Creation functions as a shared language to enhance the identification of Japanese companies with corporate governance reform (Japan Exchange Group 2020).

Similar to the TCFD-aligned guidelines in other countries, Japan's TCFD Guidance focuses on the climate-related impacts on financial performance. Japan experienced severe environmental problems in the last century and expended great effort to mitigate this situation (Leung 2021). After the Paris Agreement was adopted in 2015, Japan responded to this global call for climate action. However, corporate disclosures on climate change were inadequate (Japan Exchange Group 2020). Japan's TCFD Guidance aims to enhance Japanese companies' climate actions. It provides recommended disclosures for specific sectors, including the automobile, iron and steel, chemical, electrical and electronic, and energy sectors. These selected sectors usually generate high GHG emissions, and investors use climate disclosures to differentiate listed companies in these sectors (Palea and Drogo 2020).

In March 2020, Japan Exchange Group (JPX) and Tokyo Stock Exchange (TSE) jointly published the Practical Handbook for ESG Disclosure (the JPX Guide). ESG reporting is voluntary for listed Japanese issuers.

The JPX Guide suggests that listed issuers identify ESG issues and understand ESG investment. Good ESG performance positively affects corporate financial performance and reduces investment portfolio risk, as identified by the JPX Guide (Cahan et al. 2016; Czerwińska and Kaźmierkiewicz 2015). Akin to ESG guides from other stock exchanges, the JPX Guide also highlights stakeholder engagement and top-level management involvement in the materiality analysis process. Specifically, the JPX Guide encourages listed companies to perform a plan-do-check-act (PDCA) cycle to ensure specific ESG metrics and targets for corporate development.

2.5.5 Malaysia

In 2006, the Bursa Malaysia's (BM) CSR framework (the BM framework) required publicly listed companies in the access, certainty, efficiency (ACE) market and main market to report social and environmental activities in their annual reports (Abdillah and Husin 2016; Leung 2021; Ngu and Amran 2021). The BM framework lists four major focuses of CSR performance: environment, workplace, market, and community. In 2007, BM added a mandatory CSR reporting requirement to its listing rules.

In 2015, BM amended its listing rules to update the requirements on sustainability reporting. Listed Malaysian issuers must disclose economic, environmental, and social (EES) risks and opportunities. In particular, main market issuers need to report the scope of sustainability disclosures, governance structure, and management of EES risks and opportunities. The amendment does not apply to the ACE market due to different firm sizes and industry types (Baldini et al. 2018).

To help listed Malaysian issuers comply with sustainability reporting requirements, BM published and revised its Sustainability Reporting

Guide (the BM Guide) in 2015 and 2018. The current version of the BM Guide includes the latest case studies, integrates the UN SDGs and the TCFD recommendations with reporting strategies, and provides some guidance on integrated reporting. There is also a chapter focusing on external assurance. The type and level of external assurance depend on the issuers' size, risks, and budget (Bursa Malaysia 2018).

The countries discussed above all have regulations regarding ESG reporting guidelines or certain ESG disclosure aspects. Local stock exchanges and regulators provide ESG reporting guides for listed companies to improve ESG reporting practices. Since the definition of ESG is constantly changing due to the various sustainability problems, local stock exchanges and regulators update ESG reporting regulations or release new guidelines catering to the latest global ESG trends, such as climate change.

2.6 ESG Reporting Theories

Sustainability reporting does not have common standards, and issuers can adopt different forms and disciplines to organise their sustainability disclosures, such as CSR reports, ESG disclosures, and GHG reports (Turzo et al. 2022). Prior studies have found that different theories could explain sustainability reporting practices (Turzo et al. 2022; Zamil et al. 2021). Agency theory, legitimacy theory, signalling theory, institutional theory, stakeholder theory, and voluntary disclosure theory are major theoretical lenses for analysing determinants and motivations of social, environmental, and sustainability disclosures (Cho et al. 2015; Gray et al. 1995; Ortas et al. 2015; Zamil et al. 2021; Zhao and Patten 2016). The following sections provide a general overview of the common theories evolving in this field.

2.6.1 Agency Theory

According to agency theory, agents often make decisions not on behalf of the interests of their principals but based on pursuing their personal

illegitimate gains, which leads to unethical agency relationships (Donaldson and Davis 1991; Ross 1973). Agency theory explains how managers select information in voluntary disclosure. Managers should act on behalf of shareholders; however, the information asymmetry between managers and shareholders induces adverse selection, moral hazards, and additional agency expenses for monitoring, bonding, and residual loss (Barako et al. 2006; Jensen and Meckling 1976; Ross 1973). The conflicting interests of managers and shareholders may trigger agency problems such as management tending to maximise short-term firm value, while shareholders focus on long-term firm value (Healy and Palepu 2001). Agency problems may lead to opportunistic behaviour of senior managers while compiling or selecting social and environmental information in ESG disclosure, which may decrease the valuation of a firm's economic capital (Chow and Wong 1987; Guay et al. 2004; Healy and Palepu 2001; Jones 1995). Thus, companies are responsible for establishing an accountable corporate governance structure and system to show a transparent flow of information within business operations (Jensen 1993). Thus, accountability of corporate governance in delivering ESG is crucial to mitigate information asymmetry and agency costs between companies and investors (Arayssi et al. 2020).

2.6.2 Legitimacy Theory

Organisations adopt legitimization strategies via different forms of media, such as annual reports, standalone sustainability reports, and corporate websites to gain, maintain, or repair legitimacy (Guthrie and Parker 1989; O'Donovan 2002; Aerts and Cormier 2009). Organisations need to ensure that their corporate behaviour is legitimate in the eyes of the public and should be consistent with generally accepted social norms (Cho et al. 2015). Deegan (2002) notes that companies need to obtain social acceptance, gain a social license to operate, and gain necessary and valuable resources to secure legitimacy for business survival (Suchman 1995; Hahn and Kühnen 2013).

Prior studies have examined the different communication strategies that a company adopt, such as annual reports or sustainability reports to maintain or repair organisational legitimacy while facing accidents or unpredictable crises (De Villiers and Alexander 2014). On-going legitimacy threats as well as long-standing legitimacy gaps exist in controversial industries (Leung and Gray 2016; Leung 2019). Companies appear to use social, environmental, or sustainability reporting for window dressing, camouflaging, or impression management (Boiral 2013; Cho and Patten 2007; Leung and Snell 2021). Thus, ESG disclosures become symbolic reporting rather than substantive responses to stakeholders' expectations. This situation exists even when mandatory reporting regulations are released (Haji et al. 2022).

2.6.3 Signalling Theory

Under signalling theory, an organisation conveys information about itself to a second party when there is information asymmetry (Hahn and Kühnen 2013; Spence 1973). Corporate ESG performance can be treated as asymmetric information because it is difficult for external stakeholders to access or gain internal information for verification. Companies proactively report ESG-related information to signal their ESG activities, reduce information asymmetry, and secure legitimacy (Connelly et al. 2011; López-Santamaría et al. 2021).

Companies may release non-credible signals through misleading ESG disclosures to manipulate their legitimacy and meet stakeholder expectations. These signals lead to hypocritical sustainability reporting that is merely a façade, a symbolic front to assure legitimacy, and do not reflect companies' real ESG performance (Cho et al. 2015). Some scholars argue that such signals may harm corporate reputation and fail to provide legitimacy (Dowling and Pfeffer 1975; Hahn and Kühnen 2013; Simons 2002; Yang et al. 2021). However, some scholars disagree with this claim. In the signalling process, the market is the assessor of ESG disclosure quality,

and the signals sent through corporate ESG disclosures are not necessarily consistent with the actual impact on society and the environment (Malsch 2013). Cho et al. (2015) argue that signalling and legitimacy theory are two competing theories in the context of voluntary disclosure, and each theory predicts consequences related to companies' hypocritical use of sustainability reporting.

2.6.4 Institutional Theory

Under traditional institutional theory, ESG reporting practice is driven by three institutional isomorphisms: coercive, mimetic, and normative (DiMaggio and Powell 1983; Scott 1995). These isomorphisms complement each other to explain the external drivers of ESG reporting.

First, coercive isomorphism arises from regulative pressure, political influence, and institutional norms (Dagiliene et al. 2020; DiMaggio and Powell 1983; Stefanescu 2021). In the context of ESG reporting, coercive isomorphism may include regulatory requirements, stock exchange mandatory compliance, or specific reporting requirements on GHG emissions, mandatory compliance, and further regulations (Ortas et al. 2015). Second, mimetic isomorphism indicates that companies follow the ESG reporting practices of their counterparts to enhance their legitimacy due to uncertainty of regulatory systems and the business environment (Dagiliene et al. 2020; DiMaggio and Powell 1983; Zhao and Patten 2016). Larger companies in the industry take the lead to shape the ESG standards in this field (Ferdous et al. 2019). Third, normative isomorphism stems from professionalisation, formal education, and a professional network (DiMaggio and Powell 1983). It provides a moral basis for organisations to advance values and norms of behaviour (Ortas et al. 2015; Stefanescu 2021). Companies gain normative isomorphism when voluntarily adopting international reporting frameworks, such as the GRI, the TCFD, and the UN SDGs (Dagiliene et al. 2020). These reporting standards form professional norms by emphasising the comparability, transparency, and accountability of ESG disclosures, thus enhancing

disclosure quality (Dagiliene et al. 2020; Hummel and Schlick 2016). Thus, ESG reporting is institutionalised through these global reporting standards and guidelines (de Villiers and Alexander 2014).

2.6.5 Stakeholder Theory

Stakeholder theory indicates that companies' ESG performance impacts a wide range of internal and external stakeholder groups from different perspectives (Buchholz and Rosenthal 2005; Freeman 1984; Laplume et al. 2008; Matos 2020). Frooman (1999) suggests that two competing views dominate in stakeholder theory: ethical and managerial. In the ethical view, companies should provide transparent social and environmental information to all stakeholder groups to meet their expectations, and stakeholders have the right to require certain social and environmental information (Freeman 1984; Mitchell et al. 1997). In the managerial view, the identification and salience of stakeholders are evaluated by managerial assessments (Mitchell et al. 1997). The role of social, environmental, and sustainability information can determine the actions of influential and powerful stakeholders who can assist organisations in terms of legitimisation, risk management, and business survival (Greenwood 2007; Islam and Deegan 2008). In other words, the more stakeholders' resources are associated with the continuity and existence of companies, the more likely the stakeholders' expectations are addressed (Islam and Deegan 2008). Thus, companies have different strategies to manage a wide range of stakeholders (Herremans et al. 2016).

Stakeholders increasingly demand and focus on corporate sustainability information, such as reaction to climate change, employment practices, and anti-corruption measures (Matsumura et al. 2014). Environmental and social problems pose risks to business operations, and companies use ESG disclosures to report sustainability risks and opportunities to address stakeholders' concerns (O'Dwyer and Unerman 2020).

2.6.6 Voluntary Disclosure Theory

Voluntary disclosure theory is an economics-based theory and argues that corporate disclosures are meant to communicate with market participants (Dye 1985; Guidry and Patten 2012; Lang and Lundholm 1993; Verrecchia 1983). Literature on voluntary disclosure theory generally focuses on financial reporting but is being increasingly developed in the sustainability reporting domain due to the increasing demand for ESG information from investors (Baloria et al. 2019). Under voluntary disclosure theory, companies with better environmental and social performance tend to use ESG disclosures to report to investors, shareholders, and other stakeholders their proactive ESG strategies (Depoers et al. 2016; Guidry and Patten 2012; Thorne et al. 2014; Zharfpeykan 2021). Prior research has found that voluntary ESG disclosures lead to better financial performance, such as reduction in the cost of capital, higher market value, and higher profitability (Brogi and Lagasio 2019; Dhaliwal et al. 2011; Kuzey et al. 2021).

Voluntary ESG disclosures reduce information asymmetries between managers and investors but sometimes may lead to greenwashing (Dhaliwal et al. 2011; Guidry and Patten 2012; Zharfpeykan 2021). Although ESG reporting is mandatory in some areas, such as Singapore and Hong Kong, companies and senior managers can decide the contents and formats of ESG disclosures rather than follow a particular template (Depoers et al. 2016). For example, listed companies in Hong Kong can publish standalone ESG disclosures or combine them with annual reports (Hong Kong Exchanges and Clearing Limited 2021). In other words, ESG reporting is not strictly standardised (Depoers et al. 2016). This situation may cause senior managers to misuse ESG disclosures to report positive ESG performance and obscure environmental and social problems in their business operations (Deegan 2019; Leung and Snell 2021; Zharfpeykan 2021). Under this rationale, companies shift stakeholders' perceptions regarding their actual ESG performance by using misleading

sustainability reporting for greenwashing purposes (Lee and Raschke 2023).

2.7 Conclusion

This chapter introduced the evolution of ESG, global ESG reporting standards, and ESG reporting regulations and guidelines.

First, sustainability reporting emerged after phases of social reporting and environmental reporting. Related theories were also developed and enriched to explain CSR practices. Modern sustainability reporting is institutionalised by leading global reporting standards and regional regulations released by stock exchanges or governments.

Second, global ESG reporting standards have unique characteristics. The GRI is a comprehensive sustainability reporting guideline covering every aspect of economic, social, and environmental development. The GRI has added sector-specific guidelines to its reporting system, allowing organisations from different sectors to evaluate material ESG issues accurately (Eccles et al. 2012). The CDP mainly caters to institutional investors' demands and focuses on the environmental performance of organisations. The SASB Standards also target investors, highlighting the impact of ESG issues on corporate financial performance (Eng et al. 2022). The SASB Standards adopt the definition of materiality and develop sector-specific guidelines based on the materiality principle. The UN SDGs do not provide specific guidelines but depict a blueprint of sustainable development with 17 goals and 169 targets, while the TCFD emphasises the impact of climate change on corporate financial performance.

Third, governments and local stock exchanges have local ESG reporting regulations and guidelines. Under the ESG reporting regulations, listed companies need to report overall ESG information or only certain aspects in their annual reports or sustainability reports. There are three different levels for ESG disclosures: voluntary, mandatory, and comply-or-explain. Stock exchanges tend to have the TCFD-aligned ESG

reporting guidelines due to climate change issues, and they promote mandatory climate reporting.

Finally, several major theories, namely agency theory, legitimacy theory, signalling theory, institutional theory, stakeholder theory, and voluntary disclosure theory, have been adopted to examine the major determinants and motivations of social, environmental, and sustainability disclosures. Theoretical explanations of ESG disclosures have been widely discussed in the literature, and modern sustainability reporting requires a more up-to-date understanding of motivations and determinants. The latest theories include features of some traditional theories but develop new features or add new explanations from other domains to ESG reporting practices.

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Sustainable Development Goal 3 in Healthcare

3

Abstract

The Sustainable Development Goal (SDG) 3 proposed by the United Nations in 2015 gave the initiatives to ensure healthy lives and promote well-being for all at all ages. There are thirteen targets on specific issues of health and wellness. Targets 3.1, 3.2, and 3.3 are concerning population health and communicable diseases. Targets 3.4, 3.5, 3.6, and 3.A relate to non-communicable diseases, mental well-being and behavioural risks, including injuries. Target 3.7 is about reproductive health while Target 3.8 advocates universal health coverage, which is the core value and principle in the primary health movement of the World Health Organization since the historical 1978 Alma-Ata Declaration of 'Health for All by the Year 2000'. Target 3.9 describes the impacts of environment on morbidity and mortality. Target 3.B suggests access to essential medicine and vaccines. The remaining two targets, 3.C and 3.D, draw the attention to financing health and capacity building in all countries. SDG 3 addresses all major health priorities for all people in the community during their life course. This chapter will illustrate the impacts of SDG 3 and its targets in healthcare, in both the public and private sectors, with particular focus on the business side of the health, which is blooming in developed societies with the establishment of multinational medical

enterprise and health insurance organisations. Issues arising from the COVID-19 pandemic will be addressed with respect to SDG 3, including strengthening capacity in public health practices in outbreaks management, training and competency of professionals, and technology adoption in the community.

Keywords

Sustainable Development Goal 3 • Universal health coverage • Health insurance • Digital health • Sustainable environment • COVID-19

3.1 Introduction

Ensuring healthy lives and promoting well-being for all at all ages are the main focus of the Sustainable Development Goal (SDG) 3, as proposed by the United Nations in 2015, and remain a major agenda in research studies and policy formulation (Yeh et al. 2022). The thirteen targets contribute to comprehensive coverage on a range of specific issues regarding health and wellness. Targets 3.1, 3.2, and 3.3 are concerning population health and communicable diseases. Targets 3.4, 3.5, 3.6, and 3.A relate to non-communicable diseases, mental well-being, and behavioural risks, including injuries. Target 3.7 is about reproductive health while Target 3.8 advocates universal health coverage, which is the core value and principle in the primary health

movement of the World Health Organization since the historical 1978 Alma-Ata Declaration of 'Health for All by the Year 2000'. Target 3.9 describes the impacts of environment on morbidity and mortality. Target 3.B suggests access to essential medicine and vaccines. The remaining two targets, 3.C and 3.D, draw the attention to financing health and capacity building in all countries. SDG 3 addresses all major health priorities for all people in the community during their life course.

This chapter will use relevant examples of progress and achievements of SDG 3 in both public and private sectors to illustrate the impacts of SDG 3 and its targets in healthcare. Particular focus is made on the business side of the health, which is blooming in developed societies with the establishment of multinational medical enterprise and health insurance organisations. Finally, issues and challenges arising from the COVID-19 pandemic will be addressed with respect to SDG 3, including important issues, such as strengthening capacity in public health practices in outbreaks management, training and competency of professionals, and technology adoption in the community.

3.2 Progress and Achievements of SDG 3

One of the pivotal targets of SDG 3 is to achieve universal health coverage, which is also a hot agenda in the healthcare and business sectors, as well as a major health policy focus around the world (Erlangga et al. 2019; Verguet et al. 2021). Universal health coverage includes financial risk protection, access to quality essential healthcare services, as well as access to safe, effective, quality, and affordable essential medicines and vaccines, thereby promoting good health and well-being for all at all ages. These objectives emphasise that people in need of healthcare services should receive them, not only those who can afford to pay for the services. The quality of healthcare services provided should improve the health of people receiving the services while the cost of using the service should not put people at

risk of financial hardship or catastrophic healthcare expenditures (Dake 2018; Parmar et al. 2014). However, achieving universal health coverage is not an easy task, and in particular, low- and middle-income countries face significant challenges primarily due to constrained and limited public resources for healthcare, inefficiency in resource allocation, and over-reliance on out-of-pocket payments, leading to forgone care for the poor due to heavy burden of financial cost (Dadjo et al. 2021; Kankeu et al. 2013). In addition, while the expansion of public health insurance aims to increase access to healthcare services for improving health outcomes and reduce the risk of financial hardship due to large healthcare expenditures, the extent to which these objectives are accomplished still remains unclear.

The impact of public health insurance has attracted increasing research and policy interest in recent years. According to the review conducted by Erlangga et al. (2019), it was found that health insurance schemes in low- and middle-income countries have improved access to healthcare as measured by increased utilisation rate of healthcare facilities. This observation is consistent with the supply-demand theory in which decreased cost of healthcare services due to health insurance would lead to higher demand. The impact of health insurance on health outcome or status was found to be positive, although more research studies in different countries were further suggested. In addition, it is noteworthy that considerable studies have indicated that failure of various health insurance programmes can be attributed to insufficient information, education, and communication for the target audience. Recently, Acharya et al. (2020) have conducted a study to investigate the effects of information, education, and communication on family enrolment in the health insurance programme in Nepal. The results suggest that knowledge of health insurance programme and interactions with friends and neighbours about the programme would lead to higher participation in the health insurance scheme. This strategy is recommended for incorporation when designing interventions for increasing enrolment in the

health insurance programme. Furthermore, achievement of SDGs seeks cooperation and collaboration between the government, civil society, and businesses (Clarke et al. 2019). To reach the goals, effective ways are needed to foster partnership between the public and private sectors. Both public and private sectors should work in genuine collaboration to achieve the health-related SDG 3, including the targets of universal health coverage.

Access to safe, effective, quality, and affordable medicines and vaccines is a critical component of universal health coverage, as also specifically mentioned in Target 3.8 (Wirtz et al. 2017). In addition, Target 3.B emphasises the importance of research and development of essential medicines and vaccines, as well as the proportion of healthcare facilities having a core set of essential medicines which are accessible and affordable. The Lancet Commission on Essential Medicines for Universal Health Coverage made recommendation that it is critical for countries to develop and maintain effective information systems to provide periodic monitoring of availability, pricing, and affordability of medicine and vaccines. These are all having significant implications for the pharmaceutical industry and healthcare sector in relation to SDG 3 in healthcare. In fact, there are competing objectives in the pharmaceutical sector that may be compromised by stakeholders. These objectives include ensuring availability of quality generic and innovative products, enhancing equity and accessibility, encouraging appropriate use, and keeping affordable costs (Wagner et al. 2014). For a sustainable economy and health security, manufacturers need to be profitable while producing quality products which are affordable to the patients. Furthermore, pharmaceutical products are indispensable contributing factors to improve health outcomes (Hafner et al. 2017). To meet the evolving needs, research-based companies are required to develop innovative products. In all processes, adherence to transparent governance and ethical business practice are essential. However, these objectives are inevitably competing in many ways, and it has been further discussed that reliable and

effective information systems are essentially important to provide support to business leaders and policymakers for achieving the SDG 3 targets (Konduri et al. 2018; Wagner et al. 2014). Moreover, the establishment of such systems is critical for ensuring clinical quality, effectiveness, and safety in universal health coverage-oriented medicines benefit schemes, with due consideration that reliable and accurate information is indispensable to the seven major components of the pharmaceutical system, as well as to the system performance measurement and resilience (Hafner et al. 2017). An efficient information system is crucial for the private sector to achieve harmonisation among different technical and financial partners.

Furthermore, according to the 2030 Agenda for Sustainable Development, voluntary national reviews are suggested to be conducted by countries to track progress towards the SDGs. However, experience drawn from the participating countries has revealed significant difficulties encountered due to limited availability of performance indicators and disaggregated data (United Nations Department of Economic and Social Affairs 2016). The persistent challenges in different rounds of national reviews also lead to the advocacy of harnessing digital health technologies for dynamic adaptation to a country-specific context so as to facilitate the tracking of progress for the SDG 3 targets (Konduri et al. 2018). Digital health is a rapidly growing business around the world and its potential to address various health needs and advance universal health coverage (UHC) has been widely recognised (Fritz et al. 2021; Wilson et al. 2021). Examples of digital health include mobile health (mHealth), telemedicine, wireless health devices, electronic medical records (EMRs) and innovative software applications. Development and adoption of digital health technologies are significantly associated with the achievement of SDG 3 (Konduri et al. 2018; Olu et al. 2019). A variety of digital health technologies which are relevant to the attainment of the overall SDG 3 have emerged (Konduri et al. 2018). They were specifically designed to meet the country's needs of pharmaceutical management information

system. To enhance the accessibility, these technologies were adapted considering the local context so that the language barriers were minimised in non-English speaking countries. For example, a regional dashboard was developed to act as an early warning system to reduce stock-outs of HIV/AIDS commodities. In response to the growing demand for active drug-safety monitoring in patients receiving long and arduous for tuberculosis, a pharmacovigilance monitoring system was designed, which is a web-based application used by physicians and regulatory bodies for monitoring the safety and effectiveness of new drugs that were conditionally approved for treating drug-resistant tuberculosis. In 2017, Konduri et al. (2017) reported the user-experience study of e-TB manager, a nationwide electronic tuberculosis (TB) recording and reporting system adopted in Ukraine, which was addressing the WHO and European Respiratory Society's agenda for action on digital health and facilitating the implementation of the End TB Strategy. Overall, digital technologies have been utilised to advance patient care and strengthen surveillance and completion of reporting on disease treatment outcomes. The electronic health applications were adopted to manage drug-resistant tuberculosis with the aim of large-scale implementation of novel diagnostics and medicines.

Despite emerging rapidly in the healthcare sector and pharmaceutical business, there is still much work on the research and development for digital applications in relevant domains. Following an extensive review on the efficiency of dashboards for patient care, it was suggested that a well-planned and defined research agenda is necessary for determining the effectiveness of country- and community-level dashboards used as an early warning system for mitigating stock-outs and ensuring availability of drugs and vaccines, which is also a recognised indicator for SDG targets 3.8 and 3.B (Dowding et al. 2015; Konduri et al. 2018). In the research planning and design for adopting digital health technologies, researchers, and practitioners need to have significant consideration on relevant business practice, aspects of leadership, governance,

management, transparency, and accountability, which are important organisational and confounding factors. More research and periodic review on the use of digital health technologies to support tracking progress towards SDG 3 targets are important to various stakeholders including business leaders, policymakers, practitioners, and the general public. While a range of digital health technologies have been used to support access to medicines and pharmaceutical service, comprehensive reviews and further investigations are essential for the assessment on the usability of aggregated data and indicators to support voluntary national reviews.

Meanwhile, it is noteworthy that there have been growing studies investigating the use of indicators to assess the progress on the achievement of the SDGs (Giles-Corti et al. 2020). In a recent study by Huan et al. (2021), a systematic assessment was conducted to measure the progress of achieving SDGs using 15 countries along the 'Belt and Road' as a case study. Huan et al. (2021) select 108 indicators to construct a complete indicator framework from three sources: SDGs global indicator framework published by the United Nations Statistics Division, the World Development Indicators provided by the World Bank, and the Sustainable Development Report 2019. Among them, 14 indicators correspond to SDG 3. Some examples of identified indicators include maternal mortality ratio (related to Target 3.1); neonatal mortality rate (3.2); tuberculosis incidence per 100,000 population (3.3); mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease (3.4); alcohol consumption per capita (3.5); death rate due to road traffic injuries (3.6); adolescent birth rate (3.7); universal health coverage (UHC) service coverage index (3.8); and mortality rate attributed to unintentional poisonings (3.9). Although there are significant advantages of the constructed indicator framework, it is also acknowledged that challenges need to be further addressed in future assessment. For example, the lack of data presents huge challenges during the selection of indicators, subsequently affecting the evaluation and analysis at a later stage. Statistically, interpolation of missing

data may add to the uncertainty of final results of index, and this is further complicated by discrepancy due to different methods of interpolation (Huan et al. 2019). The SDG framework proposed by the United Nations is based on a global perspective however, different countries may face different sustainability issues and challenges, with each country having its own priorities in data collection considering the type and quality. Therefore, proposal of new substitute indicators is required for countries worldwide or even within countries in the same area. It has been suggested that for the assessment of different regions in the same country, more precise categorisation of indicators is essential for formulation of a national indicator system taking into account the country's own condition (Stafford-Smith et al. 2017).

Furthermore, SDGs are interconnected and interdependent. Among them, SDG 3 focuses on healthy lives and promotion of well-being for all at all ages. Promotion of health and well-being is not merely perceived as a single goal in terms of sustainable development. It is the indispensable component for achieving all three dimensions of sustainable development (Hill et al. 2014). As suggested by Nunes et al. (2016), integrative strategies and approaches are important to operationalise the SDGs, with emphasis on the interconnected and interdependent nature of SDGs, to provide clear indicators for measuring the progress of achieving the SDGs.

3.3 Digital Health and Conflict-Affected Areas

SDG 3 aims to achieve sustainable health and well-being for all ages in prioritised areas, such as maternal mortality, mental health, healthcare workforce, and non-communicable diseases (Heller et al. 2019). However, people in conflict-affected areas are the most vulnerable group facing severe health risks in these specific areas. Every year, millions of people are being exposed to and affected by conflicts, wars, and disasters. Therefore, innovative strategies and specific approach are necessary to achieve SDG 3 in

conflict-affected regions or fragile states (Asi and Williams 2018). The environmental, physical, and mental challenges must be considered in conflict-affected areas. The physical trauma of living is further intensified by overcrowding environment, poor immunity to diseases, as well as inadequate healthcare facilities and lack of vaccinations. The spread of contagious diseases is aggravated by war due to various circumstances, such as collapse of public health facilities and sanitation services, as well as movement of displaced people who seek shelter together (Akol et al. 2016; Cousins 2014). Exposure to the armed conflicts, accompanied by stressful life conditions and life-threatening stressors, would easily lead to different forms and levels of mental distress (Miller and Rasmussen 2010). Various reports have indicated that elevated levels of post-traumatic stress disorder (PTSD), anxiety disorder, depression, and other mental health issues are observed among war-affected populations, with the rapid growth of mental health disorders in the conflict-affected areas severely affecting the ability of people to attend to basic health needs (Canetti et al. 2010; De Schryver et al. 2015; Ringdal and Ringdal 2016). In addition, environmental challenges are causing serious concerns in war zones. Combustion of ammunition chemicals will release harmful substances and neurotoxins into the environment while military bases produce substantial pollutant, with reports suggesting the prenatal exposure to these emissions can lead to birth defects and developmental neurotoxicity in children (Arora et al. 2014; Savabieasfahani et al. 2016).

It should be noted that political instability, armed conflicts and war have long-lasting and negative impacts on the healthcare system (Pedersen 2002). Reports have suggested that in conflict-affected areas, more people died from healthcare complications than as the direct consequence of war (Trelles et al. 2015). Moreover, conflict is considered as a key social determinant of health which can lead to health inequity due to its harmful effects on both the service delivery and quality of the entire healthcare system (Bornemisza et al. 2010). In conflict-affected

areas with significant violence and political instability, access to traditional health facilities and resources, as well as the provision of healthcare workforce, are being severely hampered by the destructive effects of conflicts. To achieve SDG 3, it has been suggested that practitioners and policymakers need to redesign healthcare service delivery incorporating the advance in both medicine and technology (Boman and Kruse 2017). In addition, low-income countries should develop a certain level of independent capacity such that the healthcare service is sustainable over geographic barriers and stability can be ensured in times of conflicts (Clifford and Zaman 2016). In this regard, digital health technologies have been considered as promising tools to address the unique needs of people living in conflict-affected areas and bridge healthcare gaps in these regions (Asi and Williams 2018).

In fact, digital health has been causing a tremendous revolution in the healthcare landscape. It has been reported that digital health had a \$60.8 billion global market share in 2013, which was estimated to have quadrupled within seven years of time (Asi and Williams 2018). While there have been increasing mobile phone users globally having used a health-related phone application, mHealth applications and business are expanding in the war-affected communities. For example, mobile technologies have been adopted to deliver mental health support to people experiencing wars, conflicts, and disasters. Studies on Internet interventions has suggested the importance of developing effective mobile mental health technologies and preliminary results support the technology acceptance by war and disaster survivors. For example, PTSD Coach, a mobile mental health intervention app, has attracted significant research attention while it had been downloaded over 243,000 times by users from 96 countries (Owen et al. 2015; Ruzek et al. 2016). The advancement of app technology leads to the rapid growth of mobile intervention business. Adoption of mobile technologies in health interventions has several important advantages such as improvement in self-management of post-trauma

symptoms, enhanced healthcare delivery by mental health service providers, and increasing the effectiveness of peer support and help from mutual aid organisations. Although universal healthcare is one of the main targets of SDGs, accessing to fundamental primary care for remote populations in post-war countries still remains a daunting challenge. Kentoffio et al. (2016) have conducted a survey study in the remote district of Konobo, Liberia, which found that 73% of female participants in the study were at least with a walking distance of two hours from the nearest clinic. Asi and Williams's (2018) study has further summarised the potential of digital health adoption on health outcomes in conflict-affected communities. Digital health can change geographically based care to patient-centred care, leading to an overall improvement in access to quality care. Meanwhile, the use of collaborative standardised EMRs contributes to interorganisational and professional cooperation supported with accurate data. In addition, health and technology literacy can result in improved self-care management.

Telemedicine is another example of digital health that can provide quality healthcare access in conflict-affected areas where compromised workforce safety is a concern. In these areas, manpower shortage exists due to insufficient training and education. Therefore, telemedicine provides a potential solution for the people in the affected regions with remote access to specialists such as physicians trained for infectious disease management (Armstrong, et al. 2014).

In recent years, SDGs have further stimulated practitioners and researchers to rethink the traditional approach to achieve global health, leading to increasing opportunities for intersection of the science, technology, engineering, and mathematics (STEM) disciplines and healthcare research. In this regard, higher education plays an important role by providing the platform for the intersection of global health research with the STEM disciplines through interdisciplinary collaborations and university partnerships at international level. These partnerships not only provide excellence in education but also foster a sense of innovation, which is important towards

an accelerated progress of achieving sustainable development as informed by global health research (Clifford and Zaman 2016). Overall, the importance of university-level STEM education and research should be recognised for a sustainable workforce possessing the specific skills and public health passion to face the emerging global health challenges.

3.4 Sustainable Health and Environment

A sustainable green environment is an indispensable factor to achieve good health and well-being, with its importance conveyed in Target 3.9, which aims at substantially reducing deaths and illnesses from hazardous chemicals and pollution on the environment (Chiu and Fong 2022). With increasing life expectancy and growing worldwide population of older adults, the public awareness on the importance of a sustainable healthcare system has been rising and the demand for a green environment has further intensified (Chiu et al. 2022; Fong et al. 2021). In recent decades, environmental issues in global agro-industrial food systems have raised growing concerns over their long-term sustainability which involve the ways in which companies and institutions, farmers, food industries, and public consumers organise their practices in the production, preparation and consumption of various food products (Caron et al. 2018). These concerns arise from environmental, socioeconomic, as well as nutritional and health issues associated with improper food consumption and unhealthy diets (Serhan and Yannou-Lebris 2021).

Under these circumstances, there has been growing literature focusing on sustainability transition and business model innovation for companies to search for new business logics and novel ways of creating and capturing values for their customers, partners, and suppliers, as well as achieving the transition from 'traditional innovation for economic productivity' to 'green innovations based on the SDGs' (Casadesus-Masanell and Zhu 2013; Serhan and Yannou-Lebris 2021). However, implementation of

sustainable policies in strategic management and business models is still facing huge difficulties (Miah et al. 2018; Serhan and Yannou-Lebris 2021). Insufficient capabilities and competencies for including SDGs in business models and implementation of SDGs in operation are the major challenges (Bolton and Hannon 2016). Nurturing future leaders with capabilities of sustainability transitions is important. In 2018, Rahimifard and Trollman have emphasised the urgent need to increase engineering capabilities for integrating the fundamental principles of SDGs into engineering education and implementing SDGs in practice. Responding to the prominent needs, Serhan and Yannou-Lebris (2021) have proposed a business model framework for food eco-innovation. The sustainable business model design was based on creating a sustainable competitive advantage, aligning the organisational structure and culture with the new strategy, and building partnerships with complementors for enhancement of value in the innovation. The proposed business model framework has the objective of training students for translating and implementing SDGs in practice. In their work, two case studies were used to explain and illustrate the translation of the business model components into operational practice and sustainable food innovations which aimed to contribute to the achievement of SDG 3 targets.

3.5 SDG 3 and COVID-19 Challenges

The COVID-19 pandemic has impacted all SDGs. SDG 3, encompassing a range of health-related targets, is in particular being severely affected considering the interconnected nature of the SDGs (Khetrapal and Bhatia 2020). The unprecedented pandemic has not only disrupted people's daily lives, but also exposed fundamental weaknesses in the healthcare systems of many countries (Seshaiyer and McNeely 2020). The need to understand and address issues arising from communicable, non-communicable and environmentally diseases is explicitly highlighted in SDG 3 targets, these include attempts to

address major health priorities and are recognised as specifically relevant for the enormous efforts to combat COVID-19 and other infectious diseases. In fact, COVID-19 has brought new challenges beyond fundamental medical considerations, in particular with reference to public health and social relations. From an economic perspective, people are challenged to rethink and understand the pandemic effect on globalisation, trade and mobility, stock markets, supply chain, and workforce unemployment.

In addition, COVID-19 presents huge challenges to the SDG 3 target which aims at reducing substantially the number of deaths and illnesses due to chemical and environmental contamination (Seshaiyer and McNeely 2020). For example, minority and low-income populations are employed for work involving the use and handling of toxic chemicals, which may influence the infection morbidity and mortality rates in relation to COVID-19. Moreover, different types of wastes such as domestic refuse and other commercial or institutional wastes, which may be frequently mixed with other contaminants, would pose strong challenges regarding management, public health, and well-being. Notably, the unprecedented rise in the use of disposable face masks has caused concerns over disposal management. Thousands of used masks may enter the environment each day and wildlife interactions with used masks have been reported in some countries. Contaminants released into the environment would also give adverse effects on human and environmental health, thereby increasing propensity to virus infection, pathogenesis, and prognosis of COVID-19 (Seshaiyer and McNeely 2020; Silva et al. 2021). COVID-19 has impact on SDG 3 in relation to health financing and workforce. While there are outside factors such as the physical and social environment, it has been suggested higher COVID-19 mortality rates may be due to deficiencies in healthcare systems. To minimise direct COVID-19 effects, it was recommended to enhance universal access to public health services for all, including uninsured workers and their families, while expanding access to paid sick leave and care leave in order to ensure income security for

people who are infected, quarantined, or providing care to others (Seshaiyer and McNeely 2020). Furthermore, COVID-19 has been affecting many areas of the healthcare industry such as long-term care, skilled nursing facilities, and assisted living facilities. Additional healthcare providers are required. Likewise, the global nursing workforce, which is in shortage, needs to be strengthened and grow more for meeting the universal health targets. Although in recent years there was an overall decrease in the global shortage of nurses, the majority of deficit is still observed in low-income countries. These disparities are further exacerbated by emergent situations such as the COVID-19 pandemic, which would even place more stress on the existing and already depleted healthcare workforce and systems (Azzopardi-Muscat 2020; Ballard et al. 2020).

The onset and impact of the COVID-19 pandemic has greatly intensified the existing significance of SDG 3, with the main aspiration of achieving good health and well-being for human beings at all ages. In order to reduce the spread of misinformation and disinformation, official health and research organisations, as well as reputable medical enterprises, should continue to provide credible sources of health information. To this end, the COVID-19 pandemic has reinforced the importance of developing health literacy among the general public to meet daily health needs and future challenges. The use of a comprehensive human-centred approach, such as design thinking or systems thinking, can enhance health literacy (Fonseca and Carvalho 2015; Seshaiyer and McNeely 2020), as well as addressing the need for an inter-disciplinary and holistic approach to meet the COVID-19 challenges. Researchers from the fields of medicine, science, technology, and social science should collaborate with the government, business leaders, practitioners and other stakeholders for preparedness, prevention and control of pandemic. Moreover, innovations are important for both the healthcare and business sectors. State-of-the-art techniques, for example, 3D-printing, are employed to create low-cost and sustainable personal protective equipment (PPE). This would

also help tackle the PPE shortage in pandemic (Vordos et al. 2020). Furthermore, it is necessary to improve situational awareness in relation to the supply chain for more accurate and better prediction, prevention, and response to shortage of medical products. Ramping up production to meet acute demands in crisis is not a sustainable practice since orders may be temporary and stop after the pandemic, leading to serious financial hardship of manufacturers (Seshaiyer and McNeely 2020). In a similar context, for the pharmaceutical industry, the unprecedented global pandemic and its exceptionally large magnitude have presented uphill challenges in the scale-up of pharmaceutical supply chains for meeting the surging demand in equitable and sustainable practices (Yu et al. 2020).

Target 3.B mentions the importance of research and development on essential drugs and vaccines, and it is further reflected in the pandemic during which research and development on COVID-19 vaccines and antiviral drugs has been significantly intensified. The Solidarity drug trials have been undertaken by the WHO to determine the effectiveness and efficacy of drugs, which are already in the market for treatment of other diseases, to treat COVID-19. Yu et al. (2020) have used the case of chloroquine/hydroxychloroquine, which are originally anti-malarial drugs, to illustrate the potential obstacles and hurdles in the anticipated scale-up of the supply chains of future COVID-19 drugs. Pharmaceutical firms need to ramp up production considering the fact that the global number of people infected with COVID-19 has been continually increasing while each patient would require similar daily dosages as patients suffering from malaria during the complete treatment period. To meet the surging demand, there must be swift actions to ramp up the production of future COVID-19 drugs. However, bottlenecks may arise with regards to drug synthesis capacity or in the upstream supply chain where specialised chemical precursors are sourced (Rajeev et al. 2019). Furthermore, insufficiency of solid scientific knowledge about COVID-19 and high uncertainty in demand projections are creating significant obstacles in planning and decision-

making. These challenges against production ramp-up were further complicated by the problems caused by the pandemic. For example, substantial reduction of labour supply and raw material input have caused disruption to global supply chains, producing ripple effects across national boundaries (Yu and Aviso 2020). Subsequently, out of self-interest, shortages may prompt countries to impose restrictions on the export of drugs and their specialised or industrial chemical precursors. On the other hand, the impacts of the pharmaceutical products on the environment throughout the life cycle would also be substantially magnified due to the production ramp-up. As conventional sewage treatment plants could not destroy unmetabolised drugs and their metabolites which are widely identified as emerging contaminants, release of these chemicals into the environment would pose serious threat to human health (Gogoi et al. 2018). Five priority areas for the research and development in relation to pharmaceutical supply chains were recommended (Rajeev et al. 2019; Yu et al. 2020). These areas are decision-making under epistemic and stochastic uncertainty, optimal supply chain design considering resilience, and sustainability, game-theory integrated analysis of conflict of interest among agents in global supply chains, life cycle sustainability assessment of pharmaceutical product systems, and developing drug allocation strategies under resource or supply constraints. Overall, ramping up production at a rate to meet the surging demand due to pandemic is challenging and could lead to financial hardship for firms. A system-wide perspective and approach is needed to make accurate predictions, implement sustainable practice and address challenges from a rapid production ramp-up (Yu et al. 2020).

While the COVID-19 pandemic has created many challenges, it also leads to some opportunities. For example, the closings of school and university campus have given rise to emerging approaches for online teaching in different disciplines with the common digital conferencing platforms such as Zoom and Teams (Chiu 2020; Islam et al. 2020; Powell et al. 2022). Despite the severe impact on the economy and workforce,

opportunities for cost-saving telework and teleconferencing environment have also emerged in business operations with the rapidly increasing adoptions of digital technologies (Seshaiyer and McNeely 2020). Digital technologies include augmented/virtual reality, Internet of Things (IoT), blockchain, big data analytics, and artificial intelligence (AI), and they are having significant impacts on various domains such as education and business (Chiu 2021; Senyo et al. 2019). In addition, digital technologies see promising applications in the healthcare sector, in particular during the COVID-19 pandemic (Ting et al. 2020). In 2020, Ting et al. (2020) have explored and discussed the potential applications of digital technologies in healthcare during the COVID-19 pandemic. Selected examples of digital technologies, such as the IoT, big data, AI and blockchain, were used to augment traditional public health measures to address health issues arising from COVID-19. The direct measures to tackle COVID-19 include monitoring, surveillance, detection, and prevention of COVID-19. With regards to the direct measures, examples of technologies that are considered of high potential impact include the use of IoT for live updates on number of infections and real-time tracking of at-risk regions via different online databases. Big data analytics are important in modelling studies on viral activity, potential growth of disease, and regions of spread. They are useful for modelling studies on the preparedness and vulnerability of a country when fighting against the onset of a pandemic, of which the results would provide guidance and insights for healthcare policymakers. The indirect measures to mitigate the impact of COVID-19 include IoT and AI, which are identified as high-impact potential applications. For example, public health education and communication can be facilitated through virtual clinics as in the case of China, as well as the use of WhatsApp in Singapore for public information dissemination by the government. AI enables the use of chatbots to address public enquiry regarding COVID-19. It is noteworthy that different stakeholders including healthcare practitioners, academicians,

technology companies, NGOs, and the government should work together for effective design and deployment of chatbots to serve the purposes of preventing misinformation, facilitating symptom assessment, and lessening the mental health burden due to pandemic response (Miner et al. 2020).

3.6 Conclusion

In conclusion, tremendous amounts of research studies in relation to SDGs have been reported in recent years. In particular, SDG 3, with thirteen targets covering a range of important health issues, has remained as a major focus. Major issues regarding the progress and achievements of SDG 3, in relation to specific targets of SDG 3, have been discussed with relevant reported studies. In addition, the impact of COVID-19 on healthcare systems and SDG 3, as well as opportunities and challenges from the pandemic, have been illustrated with examples of recent efforts to address these important issues arising from the pandemic. While the COVID-19 pandemic has created many challenges and disruptions, it has led to the increasing adoption of digital health technologies, which have seen promising applications in the healthcare sector, in particular during the COVID-19 pandemic. Further efforts will be required from different stakeholders, including healthcare practitioners, academicians and experts across different disciplines, technology companies, NGOs, and the government, for the innovations and adoptions of new technologies for moving towards sustainable health and future.

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ESG Application in Sustainable Development of the Healthcare Industry

4

Abstract

The healthcare sectors tend to prioritise many materials ESG issues based on industry characteristics. First, environmental unsustainability in healthcare sectors may pose risks to companies' waste management, energy management, and resilience to climate change. Second, social sustainability, such as product and service quality, has always been the general public concern, while data privacy and security are increasingly critical due to the development of advanced information technology, such as virtual reality. Third, governance sustainability on stakeholder engagement, board involvement, anti-corruption practices, tax management, and risk management in the healthcare sectors are increasingly important. The ESG risks would adversely affect companies' financial performance by increasing the potential cost of compliance. However, organisations could transform the risks into opportunities by integrating ESG considerations and embedding ESG into corporate business strategies. ESG is expected to mitigate unsustainable issues and promote economic prosperity synchronously. Thus, healthcare service providers may benefit from ESG application in various aspects. This chapter will discuss the ESG risks and opportunities confronted by the

healthcare industry, and ESG alignment brings opportunities for business sustainability.

Keywords

Environmental social and governance (ESG) • Healthcare industry • Sustainability • ESG application • Sustainable development

4.1 Introduction

There are many topics included under each pillar of environmental, social, and governance (ESG). Multinational organisations and regional market regulators publish guidelines to define and classify ESG topics. The definition and classification of ESG topics vary due to different focus and organisational characteristics, while some common topics share a similar classification. For example, the Sustainability Accounting Standards Board (SASB) classifies the environmental pillar into six parts, namely greenhouse gas (GHG) emissions, air quality, energy management, water management, waste and material management, and ecological impacts, while the social pillar is divided into three sub-pillars: social capital, human capital, and business model and innovation (Busco et al. 2020).

Concerning regional market regulators, some stock exchanges have guidelines that classify ESG topics. The Hong Kong Exchanges and Clearing Limited (HKEX), for example, released sustainability reporting guidelines and regulations in which ESG topics clearly define three major areas as reporting provisions. First, the environmental pillar addresses emissions, use of resources, impacts on the environment and nature, and climate change. Second, the social pillar includes eight topics: employment, health and safety, development and training, labour standards, supply chain management, product responsibilities, anti-corruption, and community involvement. Third, the governance pillar provides mandatory reporting requirements, such as materiality analysis and board involvement (Hong Kong Exchanges and Clearing Limited 2022).

The healthcare industry is often associated with socio-economics and has a strong relationship with human well-being (Hensher and McGain 2020). The industry generates much waste and consumes much energy in daily operations. Additionally, the healthcare industry suffers from the negative impacts of climate change, and these need to be addressed due to healthcare's unique industry characteristics. The healthcare industry has always prioritised the social rather than the environmental pillar (PwC 2021). Good governance practices should be implemented to form an effective ESG governance structure. Efforts to improve overall ESG performance will provide the healthcare industry with economic benefits while realising sustainability and SDGs (Henisz et al. 2019; PwC 2021).

Thus, we select specific topics in each pillar of ESG in this chapter, considering the characteristics of the healthcare industry and different classifications of ESG topics. These topics are all related to the realisation of Sustainable Development Goals (SDGs) put forward by the United Nations (the UN). First, we include waste, energy, and climate change in the environmental section. Second, the social pillar involves product and service quality, supply chain management, workplace safety and employee relations,

data privacy and security, and innovation. Third, the governance pillar includes stakeholder engagement, board involvement, anti-corruption practice, tax management, and risk management.

The chapter is structured as follows. After a brief introduction, ESG application in the healthcare industry is introduced in each pillar of ESG accordingly. Second, the value creation of ESG is introduced. Finally, concluding remarks are made in the final section.

4.2 Environmental Pillar

Historically, healthcare organisations have placed greater emphasis on the social pillar of ESG performance due to its socio-economic nature. These businesses may benefit from giving equal weight to the environmental pillar (PwC 2021). This section discusses ESG practices and performance in relation to waste, energy, and climate change in the healthcare industry.

4.2.1 Waste

Researchers have provided different definitions of healthcare waste (HCW) based on its state, hazards, and materials. Healthcare waste can generally be classified into two categories: (i) general waste that is non-hazardous or non-infectious, such as plastics and packing materials; and (ii) hazardous waste, which may harm the environment and human beings (Thakur et al. 2021; Thakur and Ramesh 2015). The World Health Organization (WHO) defines seven types of hazardous HCW (World Health Organization 2018). First, infectious waste refers to waste containing contaminated equipment and tissues that may cause disease due to pathogens. Second, pathological waste involves removed body parts, tissues, organs, and fluids. Third, sharp waste includes needles, blades, and syringes. Fourth, chemical waste includes substances generated from laboratory preparations, solvents, disinfectants, and heavy metals from medical devices. Fifth, pharmaceutical waste is unconsumed but expired drugs and vaccines which may be

harmful. Sixth, cytotoxic waste contains genotoxic properties. Seventh, radioactive waste comprises products with radioactive materials (Diaz et al. 2005; Ananth et al. 2010; Thakur and Ramesh 2015).

Healthcare activities generate waste, of which 85% is general waste, and the remaining 15% is hazardous waste containing infectious, toxic, or radioactive materials (World Health Organization 2018). HCW comes from two major sources: (i) hospitals and health facilities and (ii) laboratories and research institutions (Thakur and Ramesh 2015). The volume of healthcare waste increased drastically due to the COVID-19 pandemic, which induced about 87,000 tonnes of personal protective equipment (PPE) waste in the 20 months since March 2020. Meanwhile, over 2600 tonnes of plastic waste and 731 thousand litres of chemical waste were generated by COVID-19 test kits (World Health Organization 2022a). However, about 33% of the HCW is not appropriately managed by healthcare facilities (World Health Organization 2022a), posing a great danger to environmental sustainability and public health.

HCW management can be complex and depends on different waste types, cultural backgrounds, and economic statuses where the healthcare organisations are located (Ananth et al. 2010). Although HCW management practices differ from case to case, it mainly involves six steps: collection, segregation, storage, transportation, treatment, and disposal (Ghannadpour et al. 2021; Ananth et al. 2010; Thakur et al. 2021). Safe and timely HCW management of HCW is vital to the environment and public health (Ghannadpour et al. 2021). However, there are many inadequacies in the HCW management practices, such as illegal collection, ineffective segregation, and insecure storage (Thakur et al. 2021; Zhang et al. 2013).

Sustainable HCW management should be realised through national, regional, and local cooperation. Thakur et al. (2021) present a set of criteria to evaluate the HCW management system. First, experience requires business strategies, professional knowledge, experienced staff, and a HCW management performance record.

Second, the relationship includes industrial relations with labour, community, and healthcare facilities. Third, environmental factors include geographical locations, emissions, and compliance with environmental laws. Fourth, technology and qualification show technological advancement in handling HCW. Fifth, economic aspects evaluate the financial performance of companies. Finally, a firm's capacities refer to its workforce skills and infrastructure (Ananth et al. 2010; Thakur et al. 2021).

Effective HCW management contributes to the realisation of SDG 3: good health and well-being and SDG 6: clean water and sanitation. Hazardous waste may threaten the safety of patients, the community, and environment if not disposed appropriately.

4.2.2 Energy

SDG 7: affordable and clean energy aims to promote sustainable development in energy consumption. Energy consumption is one of the primary concerns in the healthcare industry (Wang et al. 2016). Reliable, sustainable, and affordable energy is essential to improve healthcare service quality and contributes to the industry's prosperity (Franco et al. 2017). Intensive energy consumption in the healthcare industry mainly occurs in hospitals and other healthcare facilities (Buonomano et al. 2014; Wang et al. 2016). Other healthcare facilities mainly include health centres and clinics.

Hospitals consume the most energy in the healthcare industry due to patient capacity, number of staff, and range of services (Franco et al. 2017). Hospitals operate 24 h a day and have strict requirements regarding ventilation, air-conditioning, and sanitation (Wang et al. 2016). Different groups of staff work in hospitals, for example doctors, nurses, and technical healthcare staff. Apart from emergency services, hospitals provide medical analysis laboratories and storage of biochemical products (Franco et al. 2017). All these factors contribute to intensive energy consumption.

The healthcare industry must develop an effective energy management strategy. One critical step is evaluating potential solutions for providing sustainable energy services (Buonomano et al. 2014). Franco et al. (2017) identify five primary energy sources for healthcare facilities. First, generators run on fuel, natural gas, gasoline, and diesel. Using generators limits the increasing fuel costs and unstable fuel supply worldwide, particularly in a military conflict. Second, solar energy is one of the prevailing renewable energies (Backman et al. 2017). Solar-based technologies have been applied to healthcare facilities in developing countries with abundant sunlight, such as Ethiopia, Uganda, and Rwanda (Franco et al. 2017). Third, the wind is renewable and abundant depending on the geographical location. Fourth, cogeneration combines heat and power to provide electricity, thus reducing emissions and costs. Cogeneration is widely adopted in the healthcare sector in developed countries, such as the United States and the United Kingdom. Pilot programmes have been conducted in some developing countries, such as Iran, India, and Brazil (Alexis and Liakos 2013; Franco et al. 2017). Fifth, hydropower is an important non-fossil energy, but is sometimes affected by water availability due to floods or droughts caused by climate change (Weinhofer and Busch 2013).

Barriers still exist in promoting sustainable energy in the healthcare industry. First, sustainable energy requires a high initial investment and has a long payback period. Some institutional investors consider selecting ESG performance and other ESG-related projects with short payback periods (Consolandi et al. 2020; Wang et al. 2016). Second, knowledge and information regarding energy conservation may be inadequate in some countries. Third, lagging policy support contributes to barriers against promoting sustainable energy. In addition to these factors, low public awareness of the benefits of energy efficiency may also be an impediment to promoting sustainable energy (Wang et al. 2016).

Thus, joint efforts are required to create sustainability regarding energy consumption in the healthcare industry.

4.2.3 Climate Change

The United Nations proposed the 2030 Agenda for Sustainable Development (the 2030 Agenda) and described climate change as one of the most urgent sustainability issues in human society. The Paris Agreement, a legally binding multinational climate change agreement, was signed in 2015 (United Nations 2015). SDG 13: climate action, particularly address sustainable development related to climate change issues. Both these international efforts aim to help build resilience to climate change. The UK, France, Australia, China, Singapore, and Japan have released national plans responding to the 2030 Agenda and publicised their efforts to mitigate and adapt to climate change as required by the Paris Agreement (Pichler et al. 2019; United Nations 2015).

The healthcare industry is enormous and generates GHG emissions which trigger increasingly severe climate change. In 2019, emissions from the healthcare industry accounted for 4.4% of global GHG emissions (Hensher and McGain 2020). In particular, the healthcare industry in China and India contributes 5% of the world's carbon footprint (Pichler et al. 2019). The healthcare industry must commit to reducing emissions considering its contributions to GHG emissions and its role in improving universal health (Hensher and McGain 2020).

The Task Force on Climate-Related Financial Disclosures (TCFD) encourages organisations to evaluate risks and opportunities related to climate change. The TCFD suggests two major categories of climate-related risks: (i) transition risks and (ii) physical risks. Transition risks arise from the transition to a low-carbon economy and involve (i) legal and policy risks, (ii) technology risks, (iii) market risks, and (iv) reputation risks

(Task Force on Climate-Related Financial Disclosures 2017). Physical risks are induced by acute or chronic risks in climate events, such as floods, hurricanes, and wildfires and may impair regular business operations (Palea and Drogo 2020). Table 4.1 demonstrates some common risks in the healthcare industry based on the TCFD framework.

The climate-related opportunities include resource efficiency, energy source, products and service, market opportunities, and climate resilience (Task Force on Climate-Related Financial Disclosures 2017). For example, listed companies could capture green finance and tackle climate change proactively to attract sustainable investment (BDO Hong Kong 2019). Besides, business entities could expand market shares by providing products and service which generate less GHG emissions.

Climate change threatens the health of concerned populations, and the direct health effects prompt the healthcare industry to attach importance to addressing climate change (World Health Organization 2016). Organisations in the healthcare sector need to take measures to mitigate and adapt to climate change (United Nations 2015). Decarbonisation and net zero are crucial

in hospitals, clinics, and pharmacies, and the healthcare industry is expected to address climate change in practical ways (Salas et al. 2020).

4.3 Social Pillar

The social pillar has always been the priority of the healthcare industry. Despite the traditional concerns, some new topics have been added due to the development of modern technology. This section discusses these topics.

4.3.1 Product and Service Quality

SDG 12: responsible consumption and production promote sustainable development in the process of consumption and production (United Nations 2015). The SASB classifies the healthcare sector into five industries: biotechnology and pharmaceuticals, healthcare delivery, healthcare distributors, managed care, and medical equipment and supplies (Sustainability Accounting Standards Board 2013). Products and service types vary among different industries. The biotechnology and pharmaceuticals

Table 4.1 Climate-related risks in the healthcare industry

Categories	Types	Examples
Transition risks	Legal and policy risks	Implementing the country-level carbon-pricing mechanisms to reduce GHG emissions may lead the rise in compliance cost of healthcare companies
	Technology risks	Healthcare companies need to accelerate low-carbon transition by investing in improving energy structure, optimising equipment, and developing low-carbon production technologies to reduce greenhouse gas emissions in the production process
	Market risks	Regulation of carbon trading and total carbon emissions has resulted in increased greenhouse gas emissions costs, either directly (carbon taxation) or indirectly (carbon offsets, higher fuel prices, electricity prices, etc.)
	Reputation risks	Corporate reputation may be damaged if companies do not adequately respond to the climate crisis. Customer and community perceptions are changing and prone to companies which adopt low-carbon strategies
Physical risks	Acute risks	Extreme weather events may affect companies' stable production and supply chain. For example, floods may destroy factories in low-lying areas
	Chronic risks	The temperature rise will cause the healthcare companies to increase energy consumption to maintain the temperature of production plants to meet production conditions

Source From the author's research

and medical equipment and supplies industries manufacture and market biological and medicinal devices for healthcare treatment. Healthcare delivery, distributors, and managed care industries focus on providing healthcare services.

People look for quality services and products, and this desire for quality prompts the healthcare industry to consider quality as a strategic tool to achieve competitiveness (Mosadeghrad 2014). Medicine or medical devices of poor quality may harm health and cause consumer loss (Consolandi et al. 2020). Healthcare service quality is difficult to define because healthcare service is intangible and depends on the interactions of the service process, customer, and healthcare service providers (Mosadeghrad 2014). Unlike medicine or medical devices, healthcare service quality is usually difficult to assess without general standards (Mosadeghrad 2013). Companies should consider various healthcare stakeholders' expectations and priorities to improve the overall quality of healthcare products and services (Mosadeghrad 2013).

Total quality management (TQM) is widely adopted to integrate organisational functions to fulfil customers' expectations and improve system quality (Mehralian et al. 2016). TQM addresses various product and process quality issues. Influential and effective TQM requires top-level management, employee involvement, and continuous improvement of customer service (Prajogo and Sohal 2003). In biotechnology and pharmaceuticals as well as the medical equipment and supplies industries, adopting TQM practice could help companies build socially responsible images and reputations (Mehralian et al. 2016).

Healthcare service providers can improve healthcare service quality through supportive leadership, proper planning, professional education and training, and resource management (Mosadeghrad 2014). Patients' needs and concerns should be a priority. However, some healthcare providers state that the quality of healthcare service is limited to resource availability, including human, technical, and financial resources (Mosadeghrad 2013). Thus, appropriate resource management seems to be the primary concern.

Some international organisations have policies and standards on healthcare products and service quality. The International Organization for Standardization (ISO) develops and publishes international standards. The ISO 9000 series is related to quality management and aims to help improve product and service quality (Corbett et al. 2005). In the ISO 9000 series, companies can be certified through ISO 9001 to standardise their quality management systems. ISO 26000 assesses organisations' socially responsible commitment and overall performance and provides guidance on major social performance issues, such as fair operation practices, consumer issues, and labour practice. Companies may benefit from adopting the ISO 26000 standards as a framework to integrate socially responsible activities in their strategies (Tamimi and Sebastianelli 2017). Government regulations also affect the quality of healthcare. The United Kingdom, for example, passed the National Health Services Act to regulate healthcare service practices (World Health Organization 2016).

4.3.2 Supply Chain

Supply chain social responsibilities are major concerns for organisations (Basta et al. 2018). The supply chain's social pillar is ambiguous due to companies' different supply chain management practices, and there is not enough consensus regarding the range of social issues (Dai and Tang 2022). Some major ESG index providers, such as the Bloomberg ESG index, place the supply chain in the social pillar but treat it separately from other components, such as anti-corruption, human rights, and product safety (Boffo and Patalano 2020). Over the past decades, the healthcare industry has suffered from the increasing costs of product wastage (Mathur et al. 2018). Effective supply chain management is essential for companies in the healthcare industry to mitigate environmental and social risks, especially during the COVID-19 pandemic (Dai et al. 2020).

About 60% of supply chain research aims at the general process, while other supply chain

studies tend to focus on one or more phases of production, sourcing, retailing, recycling, transportation, and inventory (Basta et al. 2018). In the healthcare industry, supply chain management is vital to realising the UN SDGs, particularly SDG 3—good health and well-being (Consolandi et al. 2020).

The development of socially responsible supply chain management (SSCM) deals with deficiencies in suppliers' social performance (Alghababsheh and Gallear 2021). Some aspects of ESG performance are highlighted in the social pillar of the supply chain. For example, companies in the healthcare industry need to establish transparent supplier selection criteria (Lambert et al. 1997). Firms tend to create their socially responsible image of the supply chain by concealing suppliers with poor ethical standards (Yin and Zhang 2012). In particular, the HKEX requires all listed companies to disclose supplier information by different geographic regions (Hong Kong Exchanges and Clearing Limited 2022).

However, the implementation of SSCM may bring some challenges. Some buyers will require suppliers to invest and increase international certification, social audit, and external assurance. At the same time, these buyers may ask suppliers to reduce prices, shorten lead time, and improve product quality, resulting in tensions to the buyer–supplier relationship (Alghababsheh and Gallear 2021).

4.3.3 Workplace Safety and Employee Relations

SDG 8: decent work and economic growth aim to create full and productive employment as well as decent work for all (United Nations 2015). The SDG 8.8 suggest that companies protect labour rights and maintain safe work environment for all employees. Besides, health and well-being are top concerns of SDG 3.

Workplace safety and employee relations are primary concerns in the social pillar of ESG (CFA Institute 2019). Employees in the healthcare industry face various biological, chemical,

physical, ergonomic, and psychosocial hazards, such as HCW, waste gas exposure, laser hazards, laboratory hazards, workplace violence, and stress (World Health Organization 2022b). Healthcare workers are vulnerable to occupational injuries, particularly during the COVID-19 pandemic. In 2020, 249% of healthcare workers in the United States were involved in injuries and illness, exceeding any other industry nationwide (U.S. Department of Labor 2022).

Improving workplace safety in the healthcare industry is immediately necessary. Workplace safety performance is affected by factors including safety knowledge, motivation, psychological safety environment, and group safety environment (Christian et al. 2009). Safety knowledge and motivation are person-related factors directly related to safety participation and compliance. Psychological safety predicts individual demands and perceptions of pressure, safety-related policies, and procedures related to employee health and engagement, while group safety consists of shared perceptions of work environment attributes (Christian et al. 2009; McLinton et al. 2018).

Organisations can implement some interventions to create decent working conditions in the healthcare industry. First, employers should take measures to prevent discrimination and violence of any form against employees in the workplace. Second, occupational training should cover all employee groups. Third, the mental health of employees in the healthcare industry should be prioritised to create long-term occupational capacity, particularly in the post-pandemic period (World Health Organization 2020a).

Demir and Min (2019) suggest that talent is one of the core competencies of companies in the healthcare industry. Education, financial incentives, and regulatory support are valued by employees in the industry (Lopes et al. 2015). First, advanced education for the existing workforce improves employees' professional skills. Education and training build competencies as well as strengthen and optimise the health workforce team (World Health Organization 2020a). Some companies and organisations offer online and offline courses for continuous

education. The course contents are not restricted to up-to-date professional knowledge but include management skills, such as risk management in the post-pandemic period. Second, financial incentives include remuneration and non-wage benefits. Remuneration committees monitor and regulate remuneration systems (Mio et al. 2015). Third, regulatory support requires regulatory bodies to guarantee employees' rights. Some countries, such as Australia, the United Kingdom, Singapore, and Japan require local listed companies to disclose their labour standards, including turnover rate, training scheme, and wages and benefits (CFA Institute 2019).

4.3.4 Data Privacy and Security

Data privacy and security are important topics under the ESG framework and healthcare information management (World Health Organization 2021; Zeisel 2020). An increasing number of economic transactions and social activities are conducted online now, so privacy and data protection are highlighted. Personal data refers to any information about an identifiable individual. The data subject may not own the data, or it may be equally related to more than one person (World Health Organization 2021). In 2018, the UN released the Personal Data Protection and Privacy Principles to mandate all UN institutions to protect personal data (United Nations 2018).

The healthcare industry has relied on computing and information technology since the last century. In recent decades, the digital transformation of healthcare has been accelerated due to the development of mobile computing, cloud platforms, and machine learning (Iyengar et al. 2018). The development of big data changes the way that organisations manage their data in any industry. Healthcare data are often used for clinical and epidemiological studies, healthcare service management, and public healthcare planning (Haux 2006). The application of big data in the healthcare industry helps improve health outcomes, gain insights, prevent potential diseases, reduce the costs of healthcare products, and offer good quality of service for users.

However, ensuring data security and data privacy is not an easy task (Abouelmehdi et al. 2018).

Against this background, Abouelmehdi et al. (2018) differentiate between data security and data privacy. Data security refers to data confidentiality, integrity, and availability (Patil and Seshadri). Healthcare organisations may lack technical support or pay less attention to data security while storing, maintaining, and transmitting large amounts of data via electronic devices. The healthcare industry is one of the most vulnerable to data breaches (Abouelmehdi et al. 2018). Data privacy refers to the appropriate use of subjects' information. Patient privacy is an important element of healthcare product and service design. Data security and data privacy issues gain increasing concern as information technologies are widely applied to the healthcare industry.

Regulatory compliance is necessary to protect data security and data privacy in the healthcare industry (Iyengar et al. 2018). The WHO has proposed some principles for data protection (World Health Organization 2021). First, processing personal data should be carried out on a fair, transparent, and legitimate basis. Second, personal data are obtained and used for specific purposes only. Third, personal data should be accurate, adequate, and relevant. They cannot be stored longer than needed for the stated purposes. Fourth, the integrity and confidentiality of personal data need to be guaranteed. Approximately 71% of countries worldwide have enacted legislation to secure data privacy (World Health Organization 2021). Some jurisdictions have announced related regulations and legislation regarding data security in general or specifically in the healthcare industry. Table 4.2 presents some examples of these regulations.

4.3.5 Innovation

SDG 9 promotes sustainable development in industrialisation and encourages innovation (United Nations 2015). The ongoing COVID-19 pandemic necessitates healthcare innovation. The healthcare industry should consider how to

Table 4.2 Regulations on data security and privacy

Time	Locations	Regulations
1996	The United States	The Health Insurance Portability and Accountability Act
2012	Singapore	The Personal Data Protection Act
2016	Europe	The General Data Protection Regulation
2020	Japan	The Amended Act on the Protection of Personal Information
2021	China	The Personal Information Protection Law

Source From the author's research

choose, evolve, accelerate, and extend its efforts regarding healthcare innovation (Cohen et al. 2021). Successful innovation in healthcare services and products can help create value, increase efficiency, and minimise costs (Berry 2019). Some innovations dominate the healthcare industry (Copeland et al. 2016) and are introduced accordingly in this section.

The three-dimensional (3D) printing technique is known for its high-dimensional accuracy. Medical apparatus with specific designs can be created with 3D printing. Healthcare product providers use 3D printing to produce highly customised and economical products tailored for individual patients (Copeland et al. 2016). For example, about 200,000 amputations occur in the United States each year. Prosthetics are often priced from USD\$5000 to \$50,000, which may result in them not being accessible to some patients (Schwartz 2016). The high price hampers the realisation of SDG 3, which calls for universal access to affordable healthcare services and products (United Nations 2015). The application of 3D printing lowers the cost of prosthetics to less than USD\$200, which is much more affordable (Copeland et al. 2016).

Artificial intelligence (AI) mimics human cognitive functions and is gradually changing the healthcare industry (Yu et al. 2018). AI will likely increase the accuracy and timeliness of clinical decisions and healthcare treatments and decrease failure rates (Copeland et al. 2016; Jiang et al. 2017). The application of AI depends on two factors. First, innovators should be able to reduce costs and improve the accuracy of supportive technologies, such as natural language processing and big data. Second, stakeholders in the

healthcare industry need to increase the acceptance level and trust in AI techniques (Copeland et al. 2016). One common application of AI in the healthcare industry is autonomous robotic surgery. Robots are used to conduct autonomous knot tying, thus increasing accuracy and saving time (Copeland et al. 2016; Jiang et al. 2017).

Virtual reality (VR) is an application of computer science that allows humans to interact with computer-based models (Lányi 2006). In the healthcare industry, VR has been applied in many scenarios, such as surgery simulation, smoking cessation, and weight management (Copeland et al. 2016). VR can also create an immersive environment for overcoming pain and anxiety, leading to the development of pain-relief products (Berry 2019).

Modern healthcare monitoring is partly based on biosensors and trackers. Wearable biosensors are gaining increasing interest in the healthcare industry because they provide continuous, real-time physiologic data by measuring biochemical indicators dynamically and non-invasively (Kim et al. 2019). However, biosensors and trackers face some challenges. First, multiple approaches are taken to meet biosensors' power needs. Second, wearable biosensors should allow wireless communication and data transmission over a long distance. Third, biosensors may bring risks to data security. Companies producing biosensors and trackers need to consider these challenges seriously while promoting them to commercial markets (Copeland et al. 2016; Kim et al. 2019).

Telehealth adopts telecommunications technology to deliver healthcare services, provide information, and support healthcare education (Gajarawala and Pelkowski 2021); it provides

service users with a convenient way to access and increase self-care and reduce transportation costs and time (Copeland et al. 2016). During the COVID-19 pandemic, telehealth helped reduce risks and create low-carbon practices (Salas et al. 2020).

4.4 Governance Pillar

The governance pillar is critical to the development of the ESG management structure. SDG 17 requires partnerships to realise sustainable development. At the company level, different stakeholder groups should engage in corporate decision-making. The board of directors (the Board) and stakeholders play an important role in the process. Anti-corruption, tax management, and risk and crisis management are some major indicators of good governance related to SDG 8: decent work and economic growth as well as SDG 16: peace, justice, and strong institutions.

4.4.1 Stakeholder Engagement

Stakeholder engagement is necessary to align companies and stakeholders' interests and decide on material ESG risks which are disclosed in sustainability reporting (Moratis and Brandt 2017). In the process of stakeholder engagement, organisations develop a set of initiatives and practices to positively engage stakeholders in organisational activities and inspire changes in corporate operations which bring benefits to the environment and society (Stocker et al. 2020). Comprehensive stakeholder engagement, either direct or indirect, allows organisations to understand stakeholders' expectations, conduct materiality assessments, and prepare high-quality sustainability reports (Torelli et al. 2020).

Stocker et al. (2020) proposed a classification system of stakeholder engagement based on previous research (Gable and Shireman 2005; Gioia and Chittipeddi 1991; Morsing and Schultz 2006). First, information strategy identifies and informs stakeholders (Morsing and Schultz 2006). At this level, a narrow range of stakeholders is engaged. Companies communicate

with stakeholders through reports, brochures, newsletters, websites, and social media. Second, the response strategy consults stakeholders' interests and supports their demands (Stocker et al. 2020). Common communication channels include surveys, regular meetings, and telephone communication. Third, the involvement strategy establishes partnerships and collaborations with local and international stakeholders. Joint programmes and community projects with stakeholders are developed at this stage.

Stakeholder engagement is necessary to build a sustainable healthcare industry (Moratis and Brandt 2017; Stocker et al. 2020). As mentioned in the previous section, realising some topics in the environmental and social pillars requires accounting for stakeholders' concerns. The healthcare industry faces diverse stakeholder groups, such as patients, healthcare professionals, industry associations, governments, media, and civil society (Mehralian et al. 2016). Considering the relationship between the healthcare industry and universal health, these stakeholders have specific concerns. For example, the general public may consider how the health industry contributes to public health, while industry associations are likely to focus on addressing counterfeit medicines to ensure corporate reputation and product quality.

4.4.2 Board Involvement

The board is responsible for balancing stakeholders' interests and exercising oversight over the organisation's impact on society and the environment (Eberhardt-Toth 2017). Board-level CSR committees are established to monitor and provide information on ESG issues (Radu and Smaili 2021). According to Martín and Herrero (2020), CSR committees manage ESG-related risks and opportunities, raise awareness of ESG concerns, and promote transparent ESG performance. An organisation with a board-level CSR committee signals its concern on ESG issues and tends to have better ESG performance and sustainability reporting quality (Adams 2002; Eberhardt-Toth 2017).

A diverse and independent board tends to achieve a balance between financial and non-financial objectives and deal with conflicts of interest among stakeholders, shareholders, and managers (Martín and Herrero 2020). Academic research shows that board independence contributes to good ESG performance (Martín and Herrero 2020; Vitolla et al. 2020). Independent directors are non-executive directors who can provide professional advice on business operations. Some regional market regulators set regulations on the number of independent directors on the board. For example, the Singapore Exchange (SGX) requires that non-executive directors account for most of the Board (Monetary Authority of Singapore 2022).

Board diversity could have a wide range of perspectives rather than remain within a small group. Board diversity includes many aspects, such as gender, professional background, expertise, religious affiliation, and nationality. The most common aspect in academic research is gender diversity (Husted and de Sousa-Filho 2019; Vitolla et al. 2020). Gender-diverse boards tend to include ESG issues in corporate decision-making (García Martín and Herrero 2020). The National Association of Securities Dealers Automated Quotations (Nasdaq) in the United States established a board diversity rule which mandates Nasdaq-listed issuers to have at least one female board member and one from a minority group (Nasdaq 2022). MSCI ESG research shows that there is a stable increase rate in female representation on boards, with a 29% increase among constituents of the MSCI world index in 2021 (Mihomem 2021). Board compositions are expected to reach 30% in 2029 and 50% in 2045 (MSCI ESG Research LLC 2020). Companies in Belgium, France, and Italy normally have three women directors on the Board (MSCI ESG Research LLC 2020).

(Sommersguter-Reichmann et al. 2018). First, bribery takes place in medical service delivery in the form of informal and kickback payments. Informal payments occur in healthcare services which should be free or at a low price, while kickback payments refer to negotiated bribes (Kohler and Dimancesco 2020). Second, procurement corruption exists at all stages of procurement in different forms, including collusions with government officials, improper transactions, and submission of duplicated invoices (Kohler and Dimancesco 2020). Third, improper market relations are often identified in companies which provide pharmaceutical and medical devices. Patients and their family members are vulnerable to corrupt markets (Sommersguter-Reichmann et al. 2018). Fourth, misuse of authority overlaps with procurement corruption and improper market relations. If clinical experts join in funded research and projects on new healthcare products, they may leverage their professionals and persuade patients and their family members to use new products in healthcare practices (Norris et al. 2011). Undue reimbursement claims and embezzlement of medical products often happen in healthcare corruption.

SDG 16.5 aims to substantially reduce corruption and bribery (United Nations 2015). A whistle-blowing system effectively prevents potential corruption. The WHO supports efforts which aim to realise anti-corruption, transparency, and accountability in the healthcare industry (World Health Organization 2020b). The HKEX, for example, has mandated listed companies to disclose compliance with (i) anti-corruption regulations and (ii) implementation and monitoring of whistle-blowing procedures to create a transparent market. Further training and public education help raise awareness of anti-corruption (Hong Kong Exchanges and Clearing Limited 2022).

4.4.3 Anti-Corruption

Anti-corruption in the healthcare industry has intensified worldwide in recent years. Corrupt behaviour still exists in the healthcare industry

4.4.4 Tax Management

Taxation helps finance the realisation of SDGs and contributes to sustainable development in other ways, such as reducing inequalities and

promoting sustainable production and consumption. For example, governments use taxation to alleviate extreme inequality in wealth distribution. Government subsidies can be shifted from severely polluted corporate activities to environmentally friendly projects within companies (United Nations 2021). International cooperation and global partnerships need to be strengthened to address tax evasion and aggressive tax avoidance (United Nations 2015).

Responding to the appeal of the United Nations, the Global Reporting Initiatives (GRI) released GRI 207—tax in 2019, helping organisations manage and report taxes appropriately (Global Reporting Initiatives 2019). The reporting guidelines for taxes involve management approach disclosures and topic-specific disclosures. In the management approach disclosure section, the GRI suggests that senior management engages in tax management by reviewing and monitoring tax-related issues. Organisations should consider their stakeholders' viewpoints on tax because it is one of the primary concerns of shareholders (Davis et al. 2016; Global Reporting Initiatives 2019). GRI 207 - tax is a topic-specific GRI standard regarding economic performance in the GRI 200 series. Disclosure 207-4 requires country-by-country reporting. Companies need to disclose related information about their tax jurisdictions and the relevant time period of the reported information (Global Reporting Initiatives 2019).

Stakeholders have different concerns regarding tax disclosure. For example, the general public may focus on whether companies pay their taxes, while shareholders want to reduce taxes to increase shareholder value (Huseynov and Klamm 2012). Tax avoidance is a tax planning strategy. Generally, tax avoidance is legal, but aggressive tax avoidance, such as tax sheltering, may cause illegal fraud (Hoi et al. 2013). Thus, the extent to which companies engage in tax avoidance is important for companies' tax strategies (Davis et al. 2016). Tax-related practices are different from country to country (Global Reporting Initiatives 2019). Regarding the healthcare industry, there may be some policies on tax relief. For example, suppliers for COVID-

19 virus-prevention products in China are qualified to claim certain tax deductions (KPMG 2020).

4.4.5 Risk and Crisis Management

SDG 3 encourages all organisations to strengthen the capacity of risk and crisis management of health risks (United Nations 2015). In 2022, the COVID-19 pandemic is still ongoing, and its negative impacts on the economy have been significant. In this post-pandemic period, critical challenges are posed to society due to economic, geopolitical, and public health risks (World Economic Forum 2022). The healthcare industry is at the front line of combating these risks considering its close connection with human health.

The WHO (2019) provides some suggestions for enhancing risk management in the healthcare industry. First, the human resource department needs to recruit adequate risk management talent. Meanwhile, employees should be provided multisectoral training and capacity building to help them prepare for potential health emergencies. Second, organisations are expected to establish coordinated risk communication systems. A company's risk communication content is restricted to its relations with the market and investors. Thus, timely internal coordination for information release is critical in risk communication (Edwards and Chakraborty 2012). Third, the WHO encourages mandatory annual reporting on risk management. Disclosures on risk management are process heavy, and issuers have opportunities to display how risk management promotes good decision-making and stakeholder engagement (PwC 2019).

4.5 Value Creation

ESG alignment creates value for the healthcare industry in the form of monetary and non-monetary benefits. This section discusses the value creation of ESG from four perspectives based on principles developed by Henisz et al. (2019).

4.5.1 Top-Line Growth

Top-line growth refers to growth in the revenue of core business operations in a certain time period (de Jong et al. 2014). ESG-related top-line growth responds to customers' demand for ESG-driven products in new and existing markets (Henisz et al. 2019). Businesses with solid ESG initiatives will likely attract more business-to-business (B2B) and business-to-customer (B2C) clients with more sustainable products. Resources may be more accessible for these businesses due to more substantial community involvement and government relations.

The triple bottom line is widely adopted to integrate sustainability into business operations to balance economic goals with the environmental and social concerns of stakeholders. However, focusing on the bottom line may sometimes obscure potential innovation and value creation. Thus, the triple top line was developed so that products improve the environment and society while bringing monetary profits (McDonough 2002). Companies in the healthcare industry could consider adopting top-line strategies and transforming them into bottom-line performance (Edgeman et al. 2015).

4.5.2 Cost Reduction

Effective ESG alignment can help organisations reduce operating expenses on some aspects, such as raw materials, water, and energy. For example, the 3 M company is a leading company in sustainability actions. One of its major businesses is providing healthcare products, such as medical tapes and surgery masks. In 1975, the 3 M company started the 3 M Pollution Prevention Pays (3P) programme which has reduced 2.1 million tonnes of potential pollution and saved about USD\$200 billion in costs (Henisz et al. 2019). Some hospitals and academic medical centres simultaneously use alternative drugs to reduce pollution and costs. The Ohio State University Wexner Medical Centre, for example, saved costs of USD\$185,000 by replacing desflurane in the health system (PwC 2021).

4.5.3 Investment and Asset Optimisation

The healthcare industry has received massive investments. In 2021, USD\$44 billion was increased twofold in health innovation worldwide. Meanwhile, mergers and acquisitions (M&A) of healthcare and health technology companies showed a 50% increase (McCain 2022). ESG could help allocate capital to more promising and sustainable opportunities. According to Mihomem (2021), ESG alignment is rare in healthcare funds. Only 0.15% of global healthcare funds displayed more than 50% alignment with SDG 3, and only five of these funds explained their ESG criteria in investment policies (Balaisyte et al. 2021). The most preferred companies among SDG 3-aligned funds were biotechnology firms in the United States.

4.5.4 Regulatory and Legal Interventions

More external value allows businesses to attain greater strategic independence, thus reducing their regulatory burden (Henisz et al. 2019). Governments utilise regulations that encourage greater transparency to foster trust and enhance the information available to stakeholders regarding corporate social activities (Jackson et al. 2020). Companies may be rewarded or punished for their market activities with stakeholders such as investors, customers, and employees. According to Henisz et al. (2019), government interventions put one-third of business profits at risk, and the profits at stake in the healthcare industry are approximately 25 to 30%. The percentage is even higher in other industries, such as banking and transportation. Thus, ESG alignment is vital to addressing regulatory interventions and gaining government support.

4.6 Conclusion

This chapter introduced ESG application in the healthcare industry based on environmental, social, and governance pillars.

First, waste, energy, and climate change were highlighted in the environmental pillar. Healthcare waste involves both general and hazardous waste. Improper waste management poses risks to the environment and society. An effective waste management system is vital in the healthcare industry. Healthcare facilities and hospitals consume much energy to maintain necessary operations. Some sustainable energy consumption strategies have been developed to improve low energy efficiency, but there are some difficulties in promoting these strategies, including long payback periods, insufficient professional knowledge, and favourable policy support (Consolandi et al. 2020). The negative impacts of climate change threaten universal sustainability and human health. As a socio-economically focused industry with a large quantity of GHG emissions, the healthcare industry should take actions to address climate change (Hensher and McGain 2020).

Second, regarding the social pillar, the healthcare industry focuses on product and service quality, supply chain, workplace safety and employee relations, data privacy and data security, and innovation. First, organisations in the healthcare industry provide healthcare services and products. A quality management system is adopted to monitor and improve service and product quality. There are several supporting policies related to service and product quality. Second, the social aspects of a supply chain are difficult to measure. A socially responsible supply chain should be transparent and fully disclosed in ESG reports. Third, workplace safety is important because employees in the healthcare industry are vulnerable to various hazards, and this has particularly been the case during the COVID-19 pandemic (World Health Organization 2022b). Continuous education and ongoing training ensure employees' health and safety in daily business operations. Fourth, data security and privacy are critical in healthcare information management. The healthcare industry heavily relies on computing and information technology which uses and processes a large quantity of data that should be kept confidential for appropriate use (Abouelmehdi et al. 2018). Finally, five

innovations, namely 3D printing, AI, VR, biosensors and trackers, and telehealth, are applied to the healthcare service and products.

Third, regarding the governance pillar, some aspects can improve the ESG performance of the healthcare industry. First, stakeholder engagement helps organisations understand stakeholders' expectations, address their concerns, and evaluate material ESG risks (Torelli et al. 2020). Stakeholders are composed of different groups and engagement levels (Mehralian et al. 2016; Stocker et al. 2020), and organisations must carefully deal with the relationships among all these. Second, the board is responsible for corporate ESG governance by monitoring ESG activities and balancing stakeholders' interests. Board characteristics, including independence and diversity, are important corporate governance topics that impact ESG performance. Thus, some regulatory bodies have regulations regarding board characteristics (Eberhardt-Toth 2017). Third, different types of corruption exist in the healthcare industry, and joint efforts are required to minimise such problems. Fourth, taxation finances the realisation of universal sustainability and has become a new topic of ESG (Global Reporting Initiatives 2019). Fifth, risk and crisis management are increasingly important to the healthcare industry in the post-pandemic period.

Finally, ESG creates value for organisations in the healthcare industry by inducing top-line growth, reducing costs, optimising investments and assets, and decreasing the risks from regulatory and legal interventions. In this situation, the healthcare industry may simultaneously fulfil social responsibilities and make profits.

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New Paradigms in the Business of Healthcare

5

Abstract

The healthcare business is growing fast in most countries, particularly the new economic achievers where private medical groups expand in numbers and market share alongside with the health insurance and medical supplies industries, including the multinational pharmaceutical companies. Such development has been accelerated, not only by the economic growth, but also by the increasing demand from the increasing ageing population and technology advancement, such as the Healthcare 4.0 movement, derived from Industry 4.0. New paradigms in the healthcare, and related industries, appear paramount for sustainable development as resources, whether in the public or private sectors, are not unlimited. The world economy was in the brink of recession with the COVID-19 pandemic. This requires the application of ESG in the sustainable development in healthcare. Health in All Policies, mandatory ESG, and SDG 3, research, training, and practice in these approaches are the ways forward. The chapter will present the issues in new directions and models of conducting the business in healthcare and examine how practices can affect sustainable development in health and wellness.

Keywords

Paradigm shift • COVID-19 • Resources • Sustainability • Telehealth • Integrated care

5.1 Resources are not Unlimited

Modernisation of lifestyle, particularly in the cities of developed countries, has led to increasing needs and demands for quality, ‘sophisticated’ and technology-driven healthcare services, often induced by the suppliers, including healthcare professional providers and drug companies. The situation is driven further by an increasing worldwide ageing population and the prevalence of chronic conditions, which perpetuate economic burdens to healthcare systems. Adding to this is the competition in the market share, particularly in developed countries, healthcare organisations have to deliver services in the most efficient and economical manner to sustain the business (Nasrabad 2016). New paradigms in the healthcare and related industries appear paramount to changing the concepts and practices in healthcare for sustainable development as resources, whether in the public or private sectors, are not unlimited and the world is ever-changing in all directions and arenas,

sometimes unexpectedly. The 2020 COVID-19 pandemic is devastating health systems in the world and jeopardises health outcomes already achieved. The world economy was in the brink of recession with the COVID-19 pandemic. This situation requires the application of ESG in the sustainable development in healthcare. Health in All Policies, mandatory ESG and SDG 3, research, training, and practice in these approaches are the ways forward. SDG 3 seeks to ensure health and well-being for all at every stage of life. It focuses on all major health priorities, including reproductive, maternal, and child health; communicable, non-communicable, and environmental diseases; universal health coverage; and access for all to safe, effective, quality and affordable medicines and vaccines. It also calls for more research and development, increased health financing, and strengthened capacity of all countries in health risk reduction and management (Fong 2022a, b).

Resources, whatever nature they are, are not unlimited in the world. There must be some means to allocate and utilise natural or artificial resources in an effective and intelligent manner to ensure the long-term sustainability of these essential drivers and feeders to support lives and human activities on Earth. With a worldwide and increasing ageing population, the need for smarter and innovative ways to optimise resources consumption while meeting the high demand for healthcare services is particularly important, if not urgent. New and regenerative energy resources are being developed and promoted, not only for sustainability of resources, but also for environmental protection and stopping pollution on the lands and in the oceans. This is more so after a three-year saga of the COVID-19 pandemic from the beginning of 2020, affecting all countries. Loss of lives from the viral infection is one part of the story only. The extensive damage to economy and financial growth, as well as social well-being of people, is apparent when prolonged lockdown in most countries was implemented to halt the spread of the pandemic across the continents. Many daily and routine activities, both within and across the countries, had stopped for months, resulting in mass loss of

jobs because people had to stay home to avoid local community outbreaks. Shops were closed. Domestic and international flights were stopped to minimise movements of people as a major precautionary measure in most cities and countries. All are unthinkable in the rich and technologically advanced countries in the West, which were suffering badly.

In the healthcare business, financial and human resources are main concerns in the delivery of services and their quality. It would be challenging to sustain healthcare systems if inadequate financial or human resources are available in the long run. Even without the nasty experience from the COVID-19 pandemic, most countries have had an outcry for resources to support their healthcare provision. This is partly because of the increasing ageing population, the development of expensive new technologies, and high demand, especially of quality care, from the users. Thus, new paradigms in healthcare are paramount for viability, and sustainability of healthcare systems. New directions and models of conducting business in healthcare are needed.

5.2 Paradigm Shifts in Business

A paradigm shift means a major change in the view, concepts, and practices in getting works accomplished, ranging from research to business and industry. For example, in the case of industrial goods, paradigm shifts occur when introducing new technologies that radically change the production process, amounting to a 'revolution' in challenging the status quo. It also reflects the new way of how people or practitioners think with the replacement of a prior paradigm by innovation or discovery, more so in the fast-changing world as a result of the speedy development of information technology in the era of Industry 4.0 and the Internet (Hayes 2022). New ways, sometimes labelled as 'innovative', of doing business have 'turned the entire world upside down'. Many physical daily provisions, like newspapers, letters, greeting cards, have nearly completely gone virtual. Equipment that was popular three or four decades ago has

become obsolete in no time. Nearly everybody owns a mobile phone that connects to the world across the globe via social media. Information is flooding among people in the community in all dimensions, potentially resulting in psychosocial stress and even online frauds.

In the commercial and business sector, paradigm shift often entails substantial, or even total, revamp of units or departments in the organisational structure to conform to the new way of doing business. Changes can be potentially drastic and expensive, and often financially driven for profit making. Moreover, in the highly competitive business arena, it is natural for companies to respond appropriately and speedily to the changing needs and expectations of customers in e-world to achieve long-term success in the trade, or they risk being phased out in no time.

In the case of healthcare, unlike business enterprises, whether or not the healthcare services are for-profit or non-profit making, human life, and their well-being are involved in this healthcare industry. People are not goods and cannot be regarded as such in the process of care delivery. Furthermore, the healthcare profession is intrinsically very conservative and resistant to change, no matter how much will be gained in the process. Nonetheless, Healthcare 4.0 is already there and the profession is witnessing fast growth and advancement in biomedical engineering and biotechnology, widely adopted in clinical practice and for sophisticated conditions, as well as pharmaceuticals and investigations. Artificial intelligence (AI) is making an enormous impact on the advancement of medicine. Its applications in diagnostics of various modality have shifted the paradigm in the approaches of disease management and prevention. Nonetheless, unlike business and enterprise, healthcare is commonly regarded as social welfare in the context of universal healthcare coverage promoted by the World Health Organization and adopted in countries like the United Kingdom and Australia, but is also provided as employment benefits. At the same time, healthcare is a mega international business, particularly in pharmaceuticals and health insurance, which are

dominated by multinational corporations that own chains of drug companies, hospitals, medical centres and clinics, long-term care facilities, and insurance companies.

5.3 The Pharmaceutical Industry

The pharmaceutical industry is essentially and predominantly drug-based for curative treatment of diseases and maintenance of chronic illnesses. Many lives have been saved and prolonged, respectively, leading to an increasing ageing world among most of the more developed economies. On the prevention side, vaccines are meant to avoid prevalent infections, such as seasonal influenza, chickenpox, hepatitis, and COVID-19, but their efficacy is at times 'doubtful'. Laboratory and population studies, shifting from symptomology to a cause-based analysis, are needed to address the science and cost benefits of such mass programmes in the light of evidence-based medicine and holistic understanding of vaccine-preventable diseases (Siddique 2018). There were confusing reports and controversies when the COVID-19 vaccines were first introduced in 2020, in terms of vaccine development, clinical trials, efficacy, licensing procedures, adverse effects, acceptance by the public and equity (Brüssow 2021).

Adding to the 'commercialisation' of the health industry are all sorts of supplements being marketed and designated for improvement or maintenance of health and vitality, or even anti-ageing. People are kept younger and healthier, but not necessarily happier as the majority of those taking supplements are always worried about their body and health, seeking a panacea to health and longevity. Claims of many of the supplements are not scientifically or evidence-based for the long-term consumption or health gains for the users. They are widely available to the public without strict licensing control as pharmaceutical drugs for clinical conditions. The growing business of supplements should invite the academia to a serious consideration of shifting the paradigm of healthcare studies to prevention and psychosocial well-being of the

population and the life-support environment, rather than the hardcore scientific findings of organic reactions, molecular biology, and drug–cell interactions (Siddique 2018).

5.4 Community Health Movements

Changes in healthcare are also influenced by the community health movements in the hope of maintaining wellness and psychosocial well-being, focusing on primary care and shifting the resources away from the expensive institutional management in hospitals to community-based and home care. Disease prevention and health promotion are advocated by governments, academics, and healthcare professionals to better care for the community. The World Health Organization initiated the Healthy Cities Programme in 1986 to create a health-supportive environment for enhanced access to healthcare and quality of life (World Health Organization n.d.a). Public health is gaining more attention when the entire world was fighting the COVID-19 pandemic since early 2020. All these developments, associated with new knowledge and technologies, have reshaped the principles and philosophy of medicine and healthcare in the understanding and management of diseases, resulting in the need for a paradigm shift in research, clinical practice, and health policies and financing to examine the nature of illnesses, health and wellness of the population, and the organisation of medical and health services programmes from a wider, holistic, and natural perspective and in the context of social, financial, and human potentials for sustainability of healthcare systems in the world (Siddique 2018).

5.5 Social and Cultural Shift in Healthcare

In a social and cultural context, clinical conditions surrounding individuals would have significant social implications to the family, friends, colleagues, and the community, as shown by the prevalence of chronic conditions and outbreaks

of infectious diseases. The wider population is often affected directly or indirectly. Members of the community are vulnerable and prone to contracting some diseases, particularly the old, frail, and poor, because of the local social, political, and economic forces that have apparent influence on the environment and provision of public goods including healthcare. Such phenomenon is also known as social suffering, which is not necessarily connected to resources only. Hence, healthcare services should be considered in a wider social context and scope, going beyond the biomedical model of diseases, thus a social and cultural shift of paradigm of health (Siddique 2018).

Siddique (2018) has proposed a new culture for healthcare in the context of health and human potentials, embedded with the following characteristics. (i) To align to the natural world and intelligence with green and spiritual living style, avoiding materialistic culture and science, and promoting holistic integrated medicine. (ii) To achieve caregiving and prevention, the keys in social medicine, through clinical settings that encourage well-being and healing with dialogue and communication between the doctor and patient, rather than investigations and drug therapy. (iii) To explore community-based care and community engagement in the new cultural and institutional paradigm shift of healthcare, and to build on community partnership models that also incorporate technologies and new medical and therapeutic knowledge. (iv) To engage in a whole person approach in medicine and treatment, attending to the needs of an individual, more than the usual psychosomatic well-being, in an empowered culture to educate patients the knowledge about themselves as individuals.

For years, the World Health Organization has been promoting the integration of safe and evidence-based traditional and complementary medicine into the conventional healthcare systems, which are dominated by Western medicine and the medical profession in many countries. Integrated care, or integrated medicine, is designed to provide patient-centred and quality-oriented services and should be a paradigm shift for the policymakers and the healthcare sector to

develop further (World Health Organization n.d. b). During the COVID-19 pandemic, it was found by a meta-analysis that integrated medicine could improve the clinical symptoms and infection indicators of patients, possibly related to the anti-inflammatory effects of Chinese medicine (Yin et al. 2021). It would be ideal for the community to enjoy the benefits from both the conventional, and alternative and complementary medicine in a 'new' integrated model of healthcare. There is no reason why complementary medicine should not be introduced to the medical and nursing programmes at the universities, some of which have schools of Chinese medicine under the medical faculty. Furthermore, Chinese medicine can become a clinical specialty in medicine and nursing as much as internal medicine, endocrinology, or surgery for doctors and nurses who are interested to practice Chinese medicine, making the transdisciplinary approach much easier and convenient by the same professional.

5.6 Health Insurance

Another major new paradigm appeared more than two decades ago when the insurance industry started to bloom. Like commercial and general insurance schemes, it has imposed more tasks and stringent procedures in authorisation, documentation, and treatment guidelines with reduced remuneration or discount payment to providers. The art and personal touch of clinical practice are partly substituted by tedious administrative processes that can be very time-consuming without positive impact or added value to the consultations or management of conditions for the patients and family. 'Conflict of interest', 'overservicing', 'underservicing', and even lawsuits, are not uncommon when the stakeholders are maximising their gains legitimately in accordance with the terms laid down in the policies, disregarding the objectives of clinical management. In many ways, the medical and healthcare profession is no longer in full control of patient care while quality healthcare, expected by the patients and the public, is not supposed to

be compromised, nor should suboptimal care be accepted as the 'norm'. Doctor–patient or professional–client relationship is not a concern by the third-party payers, whether they are the governments or private companies, when so-called preferred providers are engaged beyond the patient's preference.

A professor of surgery from the University of California proposed in 2001 a new paradigm to form a single voice for doctors to join force for improvement of healthcare. The professor had referred to specific areas of concern, including cost containment, in particular the expensive treatments with doubtful efficacy; appropriate number of doctors, as medics are known to be clever in finding new diseases and treatment modalities; rational application of interventions with the principles of good clinical practice; even and optimal geographic distribution of doctors; enhanced clinical training in the community for medical students; and promotion of preventive medicine (Davidson 2001). Escalating costs in healthcare and increasing expectation of patients are driving forces for stakeholders in the healthcare systems to explore new ways of efficient and effective service delivery. The systems approach is worth consideration and wide adoption by government bureaucrats (Fong 2022a, b).

Insurance, both social and private, has modified the practice of healthcare, especially the humane side of it. The rules and guidelines in schemes and policies have become the framework in which doctors and healthcare professionals are bound in rendering services to the insured, or in the case of government-operated social schemes to the general public or specific population groups in the community. Insurance allows people to minimise their financial risk and seemingly saves social resources by containing healthcare expenses through monitoring and strict control of care delivery and avoiding unnecessary services or overservicing. However, insurance schemes are expensive to operate as there are numerous administrative and monitoring processes that require input of resources. There ought to be a paradigm shift in healthcare financing to design a simple but workable and effective system. In this regard, Hong Kong is

doing well with its dual track healthcare system supported by the government's pledge '*to protect and promote public health, provide lifelong holistic health care to every citizen of Hong Kong, and ensure that no one is denied adequate medical treatment due to lack of means*' (Government of Hong Kong SAR n.d.). The system, composed of the public and private sectors, has been operating with about 5.7% of the gross domestic product (GDP) consistently over the last three decades (Ng et al. 2019). All eligible residents are automatically covered by the public services, fully funded by the government, for nominal charges, for example, 120 Hong Kong dollars per day for staying in an acute public hospital (Fong 2021). There is no means test nor complicated claim forms. Private healthcare services are entirely paid by the users, 20% of whom are covered by private insurance policies paid by the individuals themselves or the employers as staff benefits. Such system has been praised as the best in the world by a major multinational financial conglomerate. Moreover, Hong Kong has been topping the world in life expectancy since 2015, with 83.2 years for men and 87.9 years for women, respectively, in 2021 (Centre for Health Protection n.d.). This is a very impressive key performance indicator for Hong Kong, where total healthcare expenditure is relatively lower than comparable developed countries.

5.7 Technology and Artificial Intelligence in Healthcare

Medicine and healthcare are intrinsically full of complexity and uncertainty in diagnosis and results of treatment, making decision-making rather uncertain itself and difficult, especially in an era inundated with enormous data from fast state-of-the-art equipment that provides technology-based investigations. Advancement of information technology has facilitated the generation of reliable data and knowledge from big data analytics and artificial intelligence (AI), derived from machine learning, deep learning, neural networks, and natural language

processing. The new technology helps in the accuracy, quality, safety, efficiency and productivity of healthcare delivery, disease detection, and management of multiple morbidities. The application of AI in medicine and clinical practice, as well as in deployments of diagnostic tools, clinical decision support systems, and workflow optimisation aids, has assisted the doctors, nurses, and other healthcare professionals, but professional input is still needed because of the highly complex biological activities in the human mind and body, and heterogeneous treatment results. Thus, there is a paradigm shift to more AI-based research and revamped medical education to enhance decision-making by healthcare professionals through a shared pattern of focused knowledge base, especially in acute settings. The introduction of AI in medical practice is indeed a professional transformation (Efthymiou-Egleton et al. 2020). Unfortunately, many organisations lack resources or in-house expertise, or their staff are too busy to spare the time, for the introduction and installation of AI technology into the system. The situation is not helped by the perceived uncertainties and insufficient understanding of the new technology and its applications in healthcare. Somehow, routine administrative tasks like patient scheduling, supply chain management, and patient appointment can be enhanced by automation. It is imperative that healthcare providers should make some changes to the way they interact with the machines and their patients when the appropriate technologies are available. Employing AI results into consultations may be the beginning in changing the common organ-focused or disease-specific clinical practice (Bresnick 2018).

Healthcare is expected to be safe, effective, patient-centred, timely, efficient, and equitable, and preferably not disease-oriented. Patient-centred care is meant to be respectful of and responsive to preferences, needs, expectations, and values of individuals, associated with coordination and integration of care, information, communication, comfort, emotional support, involvement of family, continuity, and access of care. There is engagement and empowerment of individuals in self-care and decision-making,

leading to increase in patient compliance, better health outcomes, client satisfaction, and quality of life. This paradigm shift to patient-centredness in healthcare is a win-win approach in realising quality, equitable, accessible, and affordable healthcare services for all. Furthermore, in the current digital health or eHealth era, new technologies contribute to the improvement of quality in healthcare by facilitating patient empowerment, engagement, and communication with healthcare professionals, leading to accessible, efficient and better health outcomes. In the community, nearly all people possess smart mobile phones. This wide adoption allows accessibility to healthcare information and communication, which are adding to patient-centred care and improving well-being and quality of life through digital monitoring by wearable devices and health applications. Healthcare services are becoming more safe, effective, and efficient. However, there are concerns about health technology. People are inundated with information that may not be accurate or useful, leading to untoward health outcomes. In summary, the paradigm shift in healthcare delivery towards patient-centred care has changed clinical practice and let individuals take on a substantial role in managing their own health. Technologies are making patient-centred activities possible and easier, more than ever, with the objectives of improving health and well-being of individuals in the community (Al Muammar et al. 2018).

5.7.1 Telehealth—Fast Development During the Pandemic

The COVID-19 pandemic has changed the world in work practices, teaching and learning, and social events. Activities that are normally conducted in the face-to-face mode have been organised via the Internet, or virtually. Meetings and conferences of all kinds and nature are being delivered online or in the hybrid mode with both face-to-face and online modalities. In healthcare, providers have been making more

online consultations to patients who are home-bound either due to the lockdown, being infected, or existing disabilities. This mode of service delivery is also adopted as a precautionary measure for social distancing during the pandemic. It helps both doctors and patients in avoiding the risk of getting infected or becoming a transmission vector of the infection (Priestman 2020). Telehealth is gaining universal acceptance as a paradigm shift in clinical practice, made feasible, and practical by the sophisticated new technology of smart phones and the fifth-generation network that is of high speed and capable of taking high-resolution images, building healthcare systems of using digital health and telemedicine in a new model of ‘Smart Health’.

However, many people in the community may not have the right device or access to digital connection for video-conferences. As in the case of online learning at the tertiary institutions, the confidence of users, and the availability of technical and social support affect the participation in the ‘new’ mode of consultations (Fong et al. 2022). These issues can be resolved readily, but not without caution. People are carrying out their daily living and professional activities within a digital world paradigm, but not routinely in the delivery of medical care. The relative resistance to technology adoption in healthcare until now has been mainly due to a combination of regulatory, structural, and economic factors. It was also because of the constraints imposed by professional regulations (The Medical Council of Hong Kong 2019), and the reimbursement system that offers higher return for face-to-face consultations. It took the COVID-19 pandemic and the chaos created by the sudden and stringent lockdowns to the fast-track uptake. In the long term, as a strategic shift of government policy of ‘digital first’ in clinical practice, telehealth should become a routine for healthcare professionals in primary care in the management of most ailments, particularly in the follow-up for long-term care of the common chronic conditions (Priestman 2020).

5.7.2 Open Innovation and Technology

Open innovation is a paradigm and model used more in the business rather than the healthcare industry. It refers to collecting internal and external innovations across the porous organisational boundary, in the forms of structured organisational alliances or strategic coventures and partnership. Companies or organisations do not have to develop their ideas in isolation. The world is always in a dynamic time of development and innovation, particularly of drugs, vaccines, and high-tech equipment, with many beneficiaries. Essentially, good ideas can come from almost anywhere, and there are always new approaches via innovative business models that help to attain outcomes even under constraints by pooling the resources to achieve synergistic effects. Examples include creative problem-solving, local product manufacture, and social entrepreneurship which are common in developing countries. Such new paradigm of model for cross-organisational and multiregional and international collaboration should be explored and introduced to healthcare systems, particularly those showing ineffective responses during the pandemic or facing critical financial or staffing situations. Open innovation invites networking, bringing in potential sources of capital, and expertise in technical, financial, managerial, and legal areas. This may help organisations, both public and private, to have access to cost-effective state-of-the-art equipment and facilities for the long-term sustainability and success of their services to the community. Practically, participating organisations and agents should attend to the social and economic value in alignment with the organisational missions and community expectations (Dandonoli 2013).

There is also a question of how healthcare systems can effectively support new innovations so that healthcare professionals and patients will optimise the benefits from the new ways of care and therapy. The long-term, continuous and sustainable impacts and viability must take priority, in addition to the immediate or short-term encouraging positive solutions (Dietrich 2022).

This consideration is a prime concern in the investment of drug development which can consume tremendous financial, time, research, and knowledge resources and may affect the sustainability of smart and innovative projects. Systems thinking may help to create a viable and workable solution platform to steer innovations and to support investors, researchers, healthcare providers, and users in the cost-effective delivery of quality care and affordable drug provisions (Fong 2022a, b). Government should encourage and facilitate companies and investors in the pursuit of open innovation to strike for collaborative partnership in the management of not only common acute and chronic conditions, but also rare diseases that are drawing more professional and public attention (Rare Disease Hong Kong n.d.).

5.8 New Paradigm in Research

In healthcare research, there should be a new paradigm for building comprehensive systems in service delivery of appropriate and integrated care. It is widely known that there exists a gap between the best practice and actual routine services in healthcare because new knowledge derived from clinical research takes years to be accepted and implemented in clinical practice which is thus often ‘suboptimal’ (Martin et al. 2013). The situation has not changed much two decades after the advocate of evidence-based medicine (EBM) in lifelong, self-directed professional education by Professor Sacket of Canada (Sacket 1997). Professional autonomy and clinical judgement often prevail in patient care, despite clinical practice guidelines, and protocols established by authorities in healthcare (Fong 2020).

Siddique (2018) has proposed to change the ‘language’ used in research and education by talking more about health and life processes and social culture. More interdisciplinary or transdisciplinary research should be encouraged in all kinds of study designs in both qualitative and quantitative methodologies, going beyond medicine and conventional healthcare, such as music,

meditation, mindfulness, and healing arts. Transdisciplinary academia should collaborate in research to work out of the box with shared values and innovative ideas for the advancement of healthcare knowledge and practices, with a focus on the natural world to enhance human well-being and potential (Siddique 2018). In practice, research grants are determined by funding bodies, including the government, foundations of various kinds, and private companies and individuals. Successful applications are selected on the basis of the merits of the submissions, but, to a certain extent, the objectives and intentions of the funders count. Thematic funding is common. During the COVID-19 pandemic, the Hong Kong SAR government had allocated additional funding to support research related to COVID-19 and other novel infectious diseases (Government of Hong Kong SAR 2020).

Many academic institutes have to sustain research programmes with funding available, which is often not enough to cover the cost of research. They need different approaches to deal with the financial situation which can be challenging to the academia, who are not financial experts by nature. They need good and smart accounting colleagues to help with large projects. This also has to work on furthering industry relationships to build and expand funding sources, or streamline research objectives to contain costs. The paradigm shift requires innovative management practices, in the form of clinical enterprises, for efficient operations. Budgeting projections should address the funding constraints and sustain the research objectives, missions, and excellence (Deloitte Center for Health Solutions 2014).

5.9 Practice Paradigms in Healthcare Systems and Organisations

Corporate social responsibility (CSR) is widely adopted by companies in the business world, but it is not commonly discussed in the context of healthcare delivery. CSR is a new paradigm in

governance, which needs to work with the management team and staff within the organisation to jointly fulfil the local social and environmental responsibilities within the scope and objectives of the organisation and in accordance with the local law, and professional and ethical standards. CSR for healthcare requires the attention to and protection of the stakeholders, including the patients, staff, and their families, and the avoidance of damages to the environment, particularly arising from infections, clinical consumables, wastes, and irradiation (Brandão et al. 2013). It is thus imperative that adequate corporate governance is regarded as the gold standard of CSR for healthcare organisations and providers. Corresponding and prevailing organisational culture and values should be nurtured to respond comprehensively and comfortably to the needs and demands of stakeholders and to uphold the highest ethical and professional standards. The new paradigm fits in the framework of environmental, social, and governance (ESG) that is also widely subscribed by business enterprises in the management of risks and opportunities on issues of sustainability, and health and safety.

The CSR and ESG frameworks are integral in the new paradigm for innovative models in healthcare practices, particularly in population health and emerging care, such as public health crisis, digital health, long-term care, home care, integrated care, personalised medicine, and community-based care. A population health paradigm aims for affordability, accessibility, effectiveness, accountability and quality of care to respond to the expectation and satisfaction of the users for better outcomes. The authors propose an ideal Community Health Model should address to these elements: availability, acceptability, accessibility, affordability, achievability, comprehensiveness, continuity, coordination, client-orientation, and cross-discipline. Risk management and financial sustainability are important issues in the process of care delivery. The recent public health disaster has called for transdisciplinary collaboration, and open innovation, across industries, and national borders, to optimally manage and control the outbreaks to

save lives and minimise the untoward impacts on the world population. This requires a major break away from the conventional approach. Experts from different professions, disciplines and trades, and localities, joint hand to formulate appropriate, feasible, practical, and targeted solutions to mitigate the consequences of the spreading infection and crisis. Unfortunately, political influence and economical consideration have been seen to take priority by some nations and their leaders during the COVID-19 pandemic.

Collaborative care models have been proposed to involve teams of healthcare professionals, not the conventional solo practitioners. Such multidisciplinary team-based care has the potential for innovation, growth, and quality as well as improvement in clinical and financial outcomes. The professional roles of individual team members have to take consideration of the objectives of the team's chartered mission and of the needs and expectations of patients, who are being cared by multiple providers. Transdisciplinary professionalism is being established to accommodate the concerted works of team members for achieving the objectives of improved outcomes, patient safety, and quality of care (Deloitte Center for Health Solutions 2014).

At the organisational level, managers should focus on specific functional areas to improve service quality and increase productivity and customer satisfaction. Service line management is a paradigm focused on patient diagnostic clusters. The specific services are delivered by a multidisciplinary team consisting of doctors, nurses, managers, supported by ancillary services, and coordinated by the service line manager. Such management structure has the advantage of being patient-centred, and coordinated for continuity and quality care, and safety of users. It is built for accountability, retaining personnel, and efficient utilisation of resources. The objectives of the small cluster are naturally well-defined for the specific services provided. Hence, teamwork and workplace spirit are easily nurtured and maintained. The success of this management model requires smart selection, appropriate training and empowerment of managers, attractive incentive plans, effective

communication among members, strategic business plans, technology supports, and conducive human resource management as well as conceptual, collaborative, interpersonal, and leadership competencies among the managers (Nasrabad 2016).

Organisations may consider a paradigm shift to alliances and network management. This is a positioning synergy for securing enhanced competitiveness in the huge healthcare market, through affiliation with strategic partnership to build up expert linkage and expand capabilities in human and financial resources. Alliances and network management helps in brand building and recognition, particularly when upmarket and popular partners or organisation are secured. Logically and naturally, exponential growth can be realised. The expected difficulties lie in the 'new' organisational culture and alignment of staff attitudes in the network. Moreover, mission and goals need to be adjusted to accommodate all players in the extended alliance or network. In this context, trust among the partners helps to mitigate problems in the 'new' organisation (Deloitte Center for Health Solutions 2014). Further studies are needed in this organisational model of healthcare.

Another important paradigm in healthcare practice is the management of patient or client relationship (Jannenga 2018). Patient expectation is growing fast in civil societies and has been perpetuated by the continuing propagation of the social media. Understanding the patients and their health-seeking behaviour and expectations is key to fostering long-term professional relationship and loyalty. This is similar to market research widely employed in the business sector. Successful enterprises know their customers as much as they know their goods and services. Not only they attract new customers, but these companies retain customers in building the business. Service providers need to learn the profiles of the new consumer, their behaviours, and expectations as customers do have choices. Similarly, patients should know the service providers, even before the initial encounter. Reputation is a prime consideration by most people in finding a provider they can trust and rely on for their personal

health and well-being. A practical approach is putting oneself in the patient's shoes. Whatever in the service process not acceptable to the provider will definitely not be impressive to the patients. The provider has the responsibility to deliver the best experience possible to every patient all the time. Furthermore, communication is also contributing to good professional patient relationship (Jannenga 2018).

5.10 A Case sharing—A New Paradigm by a New Hospital

Shatin International Medical Centre Union Hospital (Union Hospital) was a brand-new private hospital and became the first fully private hospital owned by a major land developer in Hong Kong when it was opened in 1994. Union Hospital was established 23 years after Hong Kong Adventist Hospital was opened in 1971. It then took another 23 years for another new private hospital, Gleneagles Hospital Hong Kong, to be opened for business in 2017. This one was also fully private and jointly owned by a major local land developer and a healthcare magnate from Singapore. At this juncture, there are 13 private hospitals in Hong Kong and only the two named here can have their ownership traded in the business market. The rest are either owned and operated by religious organisations or non-profit making foundations. They got the land from the government at no cost and pay a nominal annual rent for the use.

Union Hospital (the hospital) made history right from the start when the land, Lot STTL 168, was up for sale in 1982 by the government. It was the first time in Hong Kong for a piece of land to be tendered for building a private hospital. The initial consortium that secured the land did not make a move at all because it fell on the time of the Sino-British talk about the future of Hong Kong. The idling land was then acquired by a major land developer who subsequently sold it to the current owner. It took a few more years before anything started to happen on the lot in 1992 when the founding Chief Hospital Manager (CHM, and co-author of this chapter) was

recruited to set up the new hospital from ground zero. Only a bulldozer was at the scene when he visited the site immediately after the appointment. The hospital was built by the owner and the new hospital had its soft opening on 22 June 1994, less than two years after the engagement of the CHM.

The hospital had a number of new paradigms in the setting up, presentations, marketing, operations, and customer services, mostly first in the healthcare history of Hong Kong. Union Hospital was designated the first hotel-style hospital by the owner, who was operating two hotels in their company group. Decoration, furniture, and outlook of the hospital would look more like a hotel than the convention healthcare setting. Each floor had a colour scheme for the walls, doors, and curtains to fit the clinical services on the floor. It was also useful for easy recognition if anyone had gone to the wrong floor. There was a glass lift and escalators in the medical centre for outpatient services. They were the first of such facilities installed in Hong Kong hospitals. Mable tiles were used to floor the passenger lifts, making them grand looking. The new hospital took a U-turn in uniform design. All nursing staff wear light yellow shirts, pink jackets and dress, rather than the tradition white uniform and cap. White coats were replaced by light blue coats with style. Receptionists and administrative staff wore green office suits. Three experienced nurses who had just returned from working as air hostesses were recruited. They helped train the staff in mannerism and make-up lessons.

All new staff spent the first week in the training and development unit to learn about the mission and philosophy of the new hospital, administrative procedures, telephone manner, first aid, emergency responses, role play, and scenario drills. They got familiarised with all units and departments through visits and attachment. All staff were given the personal experience of riding in a wheelchair and a bed trolley. This was very educational for them to learn to transport people in a gentle and considerate manner and to ensure smooth rides for the clients, who were so important to the business of the new hospital and its financial viability.

Initially only maternity and body-check services were offered. Union Hospital was the first hospital to offer package fees for various maternity plans, like normal delivery and caesarean sections. Prospective clients would know upfront how much they would be charged, rather than getting the bills, at times for unexpected amounts, when being discharged. The package fee charging system had been adopted by other hospitals, including the Hospital Authority. The first marketing department for hospitals in Hong Kong was established at Union to build up the brand, organise press conferences, newspaper articles, information pamphlets, customer activities, hospital tours for local residents and students, and negotiation with corporate clients. Souvenir cups, with a heart-shaped icon but without the name of the Hospital, were given to all patients as a souvenir upon admission to the wards. This practice was based on the idea that the patient would continue to use the cup at home and would raise curiosity from their family and friends about the cup. Patients were provided with free toiletries in a bag bearing the name of the Hospital. They could take them home on discharge.

Union Hospital had signed a memorandum of understanding with the Faculty of Medicine of the Chinese University of Hong Kong (the University) for the later to advise on the management, professional standards, quality assurance, and training at the new hospital. The University was instrumental in establishing the Hong Kong Institute of Family Medicine which was accredited for specialist training. The hospital set up the first accredited emergency department in local private hospitals. Union Hospital was the first hospital in Hong Kong to have a website (www.union.org) and a hospital-wide computer network and intranet. Such infrastructure, together with the marketing strategies, had helped to build up its brand and reputation very quickly, even across the border in the Guangdong province, next to Hong Kong, and was financially broken even just over two years after its first opening. By far, Union

Hospital is still highly regarded for its customer service and pleasant environment.

The new paradigms of Union Hospital were initially meant to bring in new concepts in setting up and operating a private hospital. They fit in the framework of ESG. Union Hospital has been doing very well because of the solid foundation work in the organisational mission, culture, and objectives.

5.11 Conclusion

The world is always facing with uncertainty. Stakeholders, including governments, policy-makers, academics, practitioners, and people, must learn to be responsive and adaptive to changes, particularly when there are disasters and public health crisis like the COVID-19 pandemic. Never in human history that an infectious disease has such a vast impact to all systems that shape the lives of people, ruling of countries, operations of companies, etc. This is understandable because of the nature of the unexpected events and the ways and speed of their development. Emergency responses are implemented with 'limited' knowledge of the causative agent and with 'uncertain' effects, as seen in the recent pandemic. Nevertheless, there should be new paradigms in the business of healthcare to fit the current situation to serve in the best interest of the community. Stakeholders should make due diligence in studying all aspects of the healthcare system by the systems approach to obtain a global view of the care rendered to the population. Strategic planning should then be based on the findings and within the frameworks of ESG and the pertaining SDGs to render services with the key performance indicators of availability, acceptability, accessibility, affordability, achievability, comprehensiveness, continuity, coordination, client orientation, and cross-discipline. Healthcare systems will then be strong positions in their long-term sustainability with resilience to changes.

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Environmental, Social, and Governance (ESG) Promotion to Different Stakeholder Groups

6

Abstract

It is increasingly important to promote ESG to different stakeholder groups, including healthcare service providers, the healthcare industry, accounting and finance professionals, and the local community. First, healthcare service providers could enhance ESG awareness based on the United Nations Sustainable Development Goals. Second, companies in the healthcare industry are highly encouraged to impose systematic ESG management in their business operations within the industry. Third-party ESG ratings, independent assurance on sustainability reporting, and ESG certification are three common methods. Third, accounting and finance professionals are vital in offering expert advice on ESG integration and evaluating ESG performance. In particular, biodiversity accounting and carbon accounting are the two emerging ESG topics in accounting practice, while ESG financial products and financial technology in business sustainability practice are two growing issues in the field. Finally, it is vital to create ESG awareness in the local community. This chapter will introduce how ESG is promoted to four major stakeholder groups to contribute to long-term sustainability.

Keywords

Environmental social and governance (ESG) • Stakeholder • Sustainability • Sustainable development goals (SDGs) • Accounting and finance

6.1 Introduction

The realisation of long-term sustainability requires partnerships made up of different stakeholder groups (United Nations 2015). Environmental, social, and governance (ESG) practices have various forms due to stakeholders' diverse concerns and characters.

First, healthcare service providers are on the front line of implementing sustainability practices. The United Nations Sustainable Development Goals (UN SDGs) propose 17 SDGs which cover the most urgent ESG issues globally (United Nations 2015). Healthcare services can contribute to sustainability in education, gender equality, economic growth, and social justice while primarily fulfilling their obligations under SDG 3. In the post-pandemic period, it is critical for healthcare services to realise sustainability and promote economic recovery considering the healthcare sector's characteristics (Burns et al. 2021).

Second, business entities in the healthcare industry promote ESG practice, improve ESG performance, and enhance sustainability reporting quality in three ways. First, various ESG ratings provide practical evaluation standards for corporate ESG performance. Second, external sustainability assurance adds accountability and credibility to corporate ESG disclosures. Although external ESG assurance remains voluntary in many regions, some companies proactively seek ESG assurance to create responsible images. In addition to assurance of the entire ESG report, assurance of a separate pillar of ESG is available. Third, the ESG certifications help companies develop the necessary knowledge related to sustainability management, which is critical to enhancing the understanding of sustainability and improving ESG-related decision-making.

Third, accounting and finance professionals integrate ESG into industry practice. First, biodiversity has been an emerging topic in accounting and sustainability reporting in recent years. Biodiversity accounting measures the corporate impact of biodiversity, while biodiversity reporting shows how organisations address biodiversity issues (Jones and Solomon 2013). Some international organisations establish standards to regulate biodiversity reporting practices. Second, carbon accounting and reporting have been a major concern since the Kyoto Protocol in 1997. Generally, there are three kinds of carbon accounting—market-enabling, financial, and contemporary—that adopt social and environmental accounting methods (Ascui and Lovell 2011). Since the negative impact of climate change threatens overall sustainability, international organisations and regional market regulators set standards to regulate carbon reporting practices. Third, financial institutions launch ESG financial products to promote sustainable development. Four kinds of financial services—retail banking, commercial and investment banking, asset management, and insurance—target different client groups (UNEP Finance Initiative 2007). Financial institutions issue ESG financial products and instruments through these four service lines. Fourth, financial technology has been

increasingly applied in ESG investment and sustainability reporting due to the rapid development of information science and technology.

Finally, different groups in the community contribute to sustainability in specific aspects. First, higher education institutions have a special responsibility to promote sustainability due to their educational mission (Dagiliūtė et al. 2018). Universities align with ESG through governance modes, teaching methods, campus buildings, and voluntary sustainability reporting. International declarations are made to promote sustainability practices in universities. Some third-party institutions publish rankings of the sustainability performance of universities. Second, the ESG practice of small and medium-sized enterprises (SMEs) differs from that of large or multinational companies (MNCs) (Dey et al. 2018). SMEs can adopt innovative technology, advance their knowledge, and utilise supportive policies to implement ESG based on their firm characteristics. Third, some non-governmental organisations (NGOs) aim to realise sustainability in their fields, which is a primary concern covered in the UN SDGs.

This chapter is structured as follows. First, the promotion of ESG to healthcare services is discussed. Second, ESG practice in the healthcare industry is discussed. The third part of the chapter introduces how accounting and finance professionals cope with ESG concerns. Fourth, efforts of the community to realise sustainability are mentioned. Finally, some concluding remarks are provided.

6.2 Healthcare Services

The UN SDGs provide a practical framework to promote sustainability for healthcare services. In addition to SDG 3 discussed in the previous chapter, ESG practice for healthcare services covers other SDGs, such as SDG 4—quality education, SDG 5—gender equality, SDG 8—decent work and economic growth, SDG 16—peace, justice, and strong institutions, and SDG 17—partnerships to work towards the goals (United Nations 2015).

SDG 4, with 10 targets and several indicators, assures accessible and equitable education for all and creates opportunities for lifelong learning (United Nations 2015). Target 4.5 seeks gender equality and equal access to education at all levels. For example, vocational training should cover vulnerable groups, such as disabled persons, indigenous peoples, and children in vulnerable situations (United Nations 2015). The COVID-19 pandemic broke out in 2020 and became a global crisis. Healthcare service providers' primary professional education and training provide them with opportunities to learn and teach. It is vital for healthcare service providers as professionals to educate patients, caregivers, and students about healthcare knowledge (Jones and Wirnitzer 2022). Healthcare service providers can improve citizens' education by equipping them with relevant and necessary skills (Cerf 2019).

SDG 5 aims to achieve gender equality and empower all women and girls with nine targets and 14 indicators (United Nations 2015). Target 5.1 aims to end discrimination against women and girls everywhere, and Target 5.c calls for policies and legislation to promote gender equality and empower women and girls at all levels (United Nations 2015). The healthcare industry consists of more women than other industries, with women making up over 60% of the workforce (Berlin et al. 2019). During the COVID-19 pandemic, female healthcare practitioners, such as doctors and nurses have made substantial achievements in representation, particularly in senior leadership positions (Burns et al. 2021). Stakeholders, particularly investors, are increasingly considering and requiring assessment evaluation of organisations' gender diversity and equality in leadership to determine their response to ESG risks and opportunities (Baid and Jayaraman 2022).

SDG 8—decent work and economic growth—addresses two major concerns. First, it promotes comprehensive, sustainable, and long-term economic growth. Second, it encourages sufficient and productive employment and decent work for

individuals (United Nations 2015). Healthcare and social workforce investments and initiatives should ensure acceptable work conditions for all current and future healthcare occupations. Attention must be paid to improving working conditions, job security, and occupational health and safety as well as effectively recognising and implementing labour rights (World Health Organization 2018).

SDG 16 focuses on social justice and aims to create institutions with inclusiveness, accountability, and effectiveness at all levels of society (United Nations 2015). SDG 16 is vital to health. For example, about 34,000 people flee their homes in the Syrian Arab Republic, Venezuela, Afghanistan, South Sudan, and Myanmar every day, at the risk of their lives, due to conflicts or persecution, thus causing a public health crisis. Some doctors and nurses lose their lives while saving the lives of refugees (Wesley et al. 2016). Thus, public health professionals need to consider possible methods to underline the link between peace and public health.

SDG 17—partnerships for the goals—aims for cooperation to realise sustainable development. There are 19 targets in SDG 17, the most among all the UN SDGs (United Nations 2015). As suggested by SDG 17, developed countries need to help developing countries by assisting them with financial and technological resources to implement sustainable development based on their national plans (United Nations 2015). For example, before 2017, more than 1000 Chinese health professionals worked in Africa to improve African public health practices (Gao and Nkengasong 2019). In 2018, the Forum on China-Africa Cooperation's Beijing Action Plan 2019–2021 was put forward to enhance cooperation between China and Africa. Public health was a top priority among all the issues discussed (Gao and Nkengasong 2019). In 2022, the United States and Africa agreed to build a healthcare workforce in Africa through various methods, including training healthcare service providers through particular training programmes (The White House 2022).

6.3 Healthcare Industry

Companies in the healthcare industry seek different methods to improve their ESG performance and enhance the credibility of sustainability reporting. ESG ratings and external sustainability assurance are two main third-party assessment methods. Additionally, companies or employees can acquire ESG certifications proactively to enhance their ESG knowledge.

6.3.1 Third-Party ESG Rating

Socially responsible investing (SRI) has experienced rapid growth in the last decade, and investors are increasingly considering ESG factors in portfolio selection and management (Avramov et al. 2022). Specialised rating institutions provide ESG ratings to help managers and investors in the ESG-related decision-making processes (Dorfleitner et al. 2015). Currently, more than 600 ESG ratings and rankings with similar goals are available globally (Sipiczki 2022). These ESG ratings target for-profit and non-profit companies that provide sustainability-related products. At the regional level, for example, the European Commission identifies about 40 ESG ratings provided by small institutions in the European Union (EU) (International Organization of Securities Commissions 2021). A wide range of academic research measures ESG performance with third-party ESG ratings (Avetisyan and Hockerts 2017; Avramov et al. 2022). Some of the leading ESG rating agencies dominate the ESG market. Table 6.1 presents these ESG rating agencies and describes their rating methods.

Dorfleitner et al. (2015) suggest that the numerous ESG ratings lack convergence of ESG measurement concepts, coinciding neither in distribution nor in risk. Investors may be less inclined to make sustainable investments and participate in corporate sustainability issues actively due to ESG rating uncertainty (Avramov et al. 2022). ESG rating is at an early stage and is largely unregulated, with few self-regulations in

the form of codes of conduct (International Organization of Securities Commissions 2021). Thus, practical regulatory frameworks or voluntary standards are required to supervise ESG ratings. In 2022, the European Commission released a consultation paper on the functioning of ESG ratings in the EU and aimed to identify shortcomings regarding the sustainability risks in existing ESG ratings (European Commission 2021a). In the same year, the Financial Services Agency of Japan published a draft of the Code of Conduct for ESG Evaluation and Data Providers (the Code of Conduct), aiming to supervise institutions which provide ESG evaluation and data in Japan (Financial Services Agency 2022). The Code of Conduct suggests that ESG rating institutions should comply with six principles while providing relevant service. First, the quality of ESG evaluation and data provided should be guaranteed. Second, professional human resources are responsible for implementing ESG rating and need to develop their professional skills. Third, the ESG rating process should be independent, and conflicts of interest must be solved appropriately. Fourth, the ESG rating providers need to ensure the transparency of data. Fifth, the confidentiality of non-public information must be protected. Finally, the ESG rating providers are supposed to maintain sufficient communication to ensure that necessary data is obtained (Financial Services Agency 2022).

6.3.2 ESG Assurance

Audit services bring value to organisations by bolstering risk management and enhancing comprehension of emerging concerns such as sustainability (Hazaeta et al. 2022). Organisations disclose their environmental and social impacts in sustainability reports, but stakeholders sometimes remain sceptical about the credibility of ESG disclosures due to greenwashing or window dressing (Farooq and de Villiers 2019). Thus, an increasing number of organisations are seeking independent assurance for their sustainability reports to improve credibility and

Table 6.1 ESG rating agencies and rating methods

Headquarters	Agencies	Descriptions	Rating methods
The U.S.	MSCI ESG rating	It assigns ESG scores from the weighted average scores of the significant ESG issues	Letter grades from AAA (leading companies) to CCC (lagging companies)
	S&P global ESG scores	It is a percentile ranking obtained from the total sustainability score and the S&P Global ESG Rank	Percentile score with one being the worst and 100 being the best
	Bloomberg ESG data	It is a customised rating based on the extent of corporate ESG information disclosure	ESG disclosure scores ranging from 0 (no disclosure) to 100 (extensive disclosure)
Canada	Thomson Reuters ESG scores	It collects comprehensive, objective, quantitative, and qualitative ESG data and assigns a score based on ESG performance, reflecting a company's adherence to ESG principles	ESG scores ranging from 0 to 1 and corresponding letter grades from A+ to D –
The United Kingdom	Carbon disclosure project (CDP) score	It evaluates organisations' efforts to address climate change issues. Organisations that respond on time to a questionnaire sent due to investors' requests will have CDP scores	Letter grades A to D – based on questionnaire results
China	Wind ESG rating	It forecasts and evaluates the company's ESG performance, risk, and capacity to operate sustainably. It focuses on Chinese A-share companies, Hong Kong listed companies, and issuers of public offering debentures	Wind ESG rating framework

Source Adapted from Sipiczki (2022)

accountability of the reports (Martínez-Ferrero et al. 2018). In 2020, about 71% of the world's 250 largest companies conducted third-party assurance for their ESG reports (KPMG International 2020); companies in Spain and Singapore showed the largest increase (KPMG International 2020).

Hazaea et al. (2022) state that internal and external audits are essential to sustainability assurance. Internal audits are critical to implementing sustainability practices, investigating the validity of ESG disclosures, and building trust with different stakeholder groups (Aureli et al. 2020; Hazaea et al. 2022). However, internal auditors face challenges related to environmental management when providing recommendations for organisations to improve ESG performance and disclosure quality (Deloitte 2018). An increasing number of auditors prefer to be engaged in activities related to green information technology as facilitators or consultants rather than

traditional assurance providers (Gray et al. 2014). Therefore, organisations should promote and implement rigorous assurance with internal control and external auditors (Hazaea et al. 2022).

Regarding external sustainability, assurance providers' expertise may affect the quality of the reports (Balsam et al. 2003). First, specialisation is one of the most influential attributes which increase assurance quality because verifying sustainability reports involves substantial variations for organisations in different sectors or industries (Martínez-Ferrero et al. 2018). Second, various assurance providers may contribute to quality assurance at different levels (Farooq and de Villiers 2019). Generally, there are two types of major providers: accounting sustainability assurance providers (ASAPs) and non-accounting sustainability assurance providers (NASAPs) (Channuntapipat et al. 2020). ASAPs have gained a reputation as assurance experts from their experience in financial audits, so they

are likely to be more qualified to undertake sustainability assurance than NASAPs (Farooq and de Villiers 2019). Third, assurance providers' experience with clients allows more efficient assurance engagement due to increasing client-specific knowledge over time (Martínez-Ferrero et al. 2018).

In particular, certain kinds of sustainability assurance are provided to evaluate pillars of ESG performance (Hazaea et al. 2022). First, environmental assurance improves the overall environmental performance of organisations (Braam et al. 2016). It functions as a tool for companies to attract investment and helps decrease the negative impact on natural resources (Hazaea et al. 2022). Second, social assurance evaluates and monitors social performance based on the expectations of organisations and stakeholders (Channuntapipat et al. 2019). Social assurance examines how organisations improve their social performance by planning, reporting, and engaging stakeholders (Hazaea et al. 2022). Third, carbon assurance is a branch of environmental assurance that improves the credibility of carbon information and is an important dimension in carbon accounting (Fan et al. 2021). Carbon assurance often remains voluntary but is mandatory for some organisations under an emission trading scheme (Hahn et al. 2015).

6.3.3 ESG Certifications

Implementing ESG strategies in companies requires professional knowledge and the application of ESG management tools (Hörisch et al. 2015). Knowledge related to ESG management tools can be acquired both intentionally and unintentionally. In recent decades, third-party institutions have increasingly developed ESG certifications (Chkanikova and Sroufe 2021). The emergence and proliferation of various certification schemes have resulted in a multiplicity of standards, including convergence and diversification of certification establishment among diverse stakeholders. Thus, different logic is applied to build the frameworks of ESG certifications (Fransen 2018).

Individuals can obtain an ESG certification to present their understanding and application of ESG issues in institutional investment analysis. This form of analysis is essential for businesses that wish to comprehend a company's overall sustainability situation (Schweser 2022). This section will introduce some ESG-related certifications. Table 6.2 provides an overview of these certifications.

6.4 Accounting and Finance Professionals

Accounting and finance professionals have different focuses on ESG issues. This section introduces two emerging topics in accounting practice: ESG-related financial products and how financial technology is applied in sustainability practice.

6.4.1 Biodiversity Reporting and Accounting

Over the past centuries, human domination has seriously affected Earth's environment. Current trends suggest that the planet Earth is undergoing a six-period mass extinction accelerated by human activities (Skouloudis et al. 2019). Rockström et al. (2009) identify nine planetary boundaries critical to maintaining a stable Earth system, and one of the nine boundaries is biodiversity loss. If the proposed limits of these boundaries are exceeded, the entire ecosystem is likely to suffer from the threat of collapse (Steffen et al. 2015). Defining biodiversity is ambiguous and depends on the philosophical perspective that an organisation espouses (Jones and Solomon 2013). Companies typically adopt an anthropocentric and ecosystems perspective in biodiversity accounting and reporting. From the anthropocentric perspective, humans are the primary species, and other species are subordinate or subservient to human beings (Jones and Solomon 2013). The notion of biodiversity generally focuses on variation in or between species and ecosystems (Skouloudis et al. 2019).

Table 6.2 ESG-related certifications

Certifications	Authorities	Target audience
Certificate in ESG investing	Chartered financial analyst (CFA) institute	(i) Professional investors want to understand ESG issues and integrate ESG with investing decisions, and (ii) students pursue jobs in investment institutions
Certified ESG analyst (CESGA)	European federation of financial analysts societies	Financial analysts and asset managers intend to allocate capital with ESG considerations
Sustainability and climate risk (SCR) certificate	Global association of risk professionals	(i) Risk managers want to understand and manage climate-related risks, and (ii) students pursue a career in risk management
Sustainability professional credentials	International society of sustainability professionals	From beginners to experts in the sustainability domain
Fundamentals of sustainability accounting credential	Sustainability accounting standards board foundation	Professionals in corporate finance and investor relations wish to gain a deeper understanding of the relationship between ESG information that has a financial impact and a company's capacity to drive enterprise value
Chartered SRI counsellor	College for financial planning	Financial advisors and professional investors are aware of the ESG definitions, trends, basic construction principles, and best practices regarding different types of ESG investments
Certificated climate change professional	Association of climate change officers	Senior practitioners demonstrate a commitment to professional growth and a command of the foundational knowledge of climate change preparedness and strategic planning

Source Adapted from Schweser (2022)

Biodiversity accounting addresses the impact of an organisation on biodiversity, while biodiversity reporting depicts an organisation's actions to enhance and protect biodiversity (Jones and Solomon 2013). Organisations are important agents of society and are accountable for their actions. Thus, they play a crucial role in overall planet sustainability (Blanco-Zaitegi et al. 2022). The environmental and social activities disclosed in sustainability reports may affect and influence stakeholders' perceptions (Gray 1992), and organisations need to include biodiversity-related information in sustainability reports. Prior research on biodiversity reporting focuses more on developed countries than developing countries (Sun and Lange 2023). Robert et al. (2021) suggest that future research in biodiversity reporting focus on how developing countries conserve biodiversity. For example, China, as a developing country, owns one of the most bio-diverse ecosystems but suffers extreme

biodiversity losses. Since biodiversity reporting is a new concept in China, researchers may explore biodiversity reporting practice in the Chinese context (Sun and Lange 2023).

Hassan et al. (2022) suggest that biodiversity loss can affect companies' social economic, and financial viability for business survival. However, relatively few companies disclose risks from biodiversity loss (KPMG International 2020). Some international guidelines, such as the Global Reporting Initiatives Sustainability Reporting Standards (the GRI Standards), aim to improve biodiversity reporting practices. The GRI Standards have topic-specific reporting guidelines regarding environmental, social, and economic performance, allowing companies to disclose related issues readily (Boiral 2016). GRI 304—biodiversity provides biodiversity reporting guidelines (Global Reporting Initiatives 2016a). It involves two parts: management approach disclosures and topic-specific

disclosures. In management approach disclosures, organisations state their strategies related to biodiversity management, including the prevention and remediation of damage to natural habitats due to organisations' activities. In topic-specific disclosures, organisations need to disclose (i) operational sites related to protected areas, (ii) impacts on biodiversity, (iii) protected or restored habitats, and (iv) protected species affected by the organisations' operation (Global Reporting Initiatives 2016a). The GRI 304: Biodiversity is one of the most widely adopted biodiversity reporting standards worldwide.

Despite the GRI Standards, some leading sustainability reporting standards cover biodiversity reporting. The International Integrated Reporting Council (IIRC) develops guidance for reporting on non-financial measures, including biodiversity loss (Atkins and Maroun 2018). Under the IIRC framework, companies should be aware of different types of capital and explain the interconnections between financial and non-financial indicators (Integrated Reporting 2021). Biodiversity is classified as natural capital, which includes all renewable and non-renewable environmental resources (Integrated Reporting 2021). The Climate Disclosure Standards Board (CDSB) (2021) released an application guidance for biodiversity reporting, allowing organisations to report biodiversity-related issues in a structured way (Climate Disclosure Standards Board 2021). The UN SDGs also include biodiversity-related goals, namely SDG 14: Life below water and SDG 15: Life on land (United Nations 2015).

Feger and Mermet (2017) suggest that accountants play an important role in biodiversity reporting. Traditional accounting fails to communicate the problem of biodiversity loss and merely measures financial performance (Jones and Solomon 2013). Biodiversity accounting sensitises stakeholders to the importance of biodiversity protection and mitigates companies' impact on biodiversity by reporting management practices (Blanco-Zaitagi et al. 2022). New forms of ecological accounting are proposed to address the deficiencies of traditional accounting regarding the measurement and

management of biodiversity loss (Russell et al. 2017). Atkins and Maroun (2018) explore a framework for extinction accounting so that companies can report their accountability to species and their management approach to prevent species extinction, namely extinction accounting. Companies need to realise the environmental and social impacts of biodiversity loss as well as the related monetary implications in the future (Atkins et al. 2018; Hassan et al. 2022; Zhang and Noronha 2022).

6.4.2 Carbon Reporting and Accounting

Carbon accounting uses different definitions for different groups. The United Nations Clean Development Mechanism (CDM), developed by the Kyoto Protocol, measures carbon accounting emission reduction and carbon credit (UN Environment Programme 2005). The International Accounting Standards Board (IASB) addresses tradable emission rights and obligations in emission trading schemes (International Accounting Standards Board 2014). For the Carbon Disclosure Project (CDP) member organisations, carbon accounting entails the measurement and reporting of greenhouse gas (GHG) emissions that bring organisations different levels of responsibility (Ascui and Lovell 2011). Ascui and Lovell (2011) identify five framings of carbon accounting based on some major groups including scientists, politicians, economists, and accountants. The latter three stakeholder groups are closely related to accounting and finance.

First, market-enabling carbon accounting arises from the emission trading mechanisms put forward in the 1990s (Ascui and Lovell 2011). The Kyoto Protocol allows countries to trade GHG emissions through flexible mechanisms to conduct and measure emission reduction (Charnock and Hoskin 2020). A global market in GHG emission rights has been developed, driven by emission obligations. While prior accounting standards focused on measuring emissions and removals within national boundaries, market-enabling carbon accounting measures the

emission reductions against an established baseline within designated projects (Mateo-Márquez et al. 2020). These emission reductions result in certified emission reductions (CERs). Developed countries may obtain CERs and utilise them to exceed specific emission caps (Ascui and Lovell 2011).

Second, financial carbon accounting emerges because carbon markets have material impacts on companies' balance sheets (Stechemesser and Guenther 2012). Thus, financial accountants deal with the accounting of rights and obligations in carbon markets (International Accounting Standards Board 2014). Accountants attempt to comprehend carbon emissions by comparing them to existing and recognisable accounting entities, such as taxes, leases, and subsidies (Ascui and Lovell 2011). Although the Kyoto Protocol creates GHG emission rights and obligations at the national level, it does not regulate corporate-level emissions. Companies need to account for new assets, liabilities, and financial flows in their financial statements due to the development of major carbon markets, such as the European Union Emissions Trading Scheme (EU ETS), the Chicago Climate Exchange, and the Japan Voluntary Emissions Trading Scheme (Martineau and Lafontaine 2019).

Third, social and environmental accounting has contributed to contemporary carbon accounting (Ascui and Lovell 2011). Corporate sustainability reporting reflects companies' social and environmental accounting of carbon emissions. GRI 305—emissions provides guidelines on GHG emission reporting; it divides GHG emissions into three types: scope 1—direct emissions, scope 2—indirect energy emissions, and scope 3—other indirect emissions. These emissions are calculated using carbon dioxide (CO₂) or CO₂ equivalent (Global Reporting Initiatives 2016b). Organisations need to include the emission intensity ratio and the quantity of reduced emissions in their sustainability reports. Despite international standards, some stock exchanges have regulations regarding carbon emissions in their sustainability reporting guidelines. For example, the Hong Kong Exchanges

and Clearing Limited (HKEX) mandates all listed companies to report the quantity and intensity of emissions, and in 2020, it provided detailed guidance to help listed companies calculate these indicators (Hong Kong Exchanges and Clearing Limited 2020). However, the reported emission data lack comparability and commensurability (Wegener et al. 2019). Researchers have called for harmonisation in sustainability reporting frameworks (Caputo et al. 2021).

6.4.3 ESG Financial Products

6.4.3.1 Retail Banking

Retail banking provides personal and business products and services for individuals, households, and small- and medium-sized businesses (UNEP Finance Initiative 2007). Retail products and services include mortgages, loans, and products related to personal accounts. Table 6.3 presents some ESG financial products in different regions.

6.4.3.2 Corporate and Investment Banking

Corporate and investment banking serves large corporations, institutions, governments, and other public bodies with complicated financial demands involving international operations. Financial institutions providing corporate and investment banking can underwrite debt issues, manage funds, and raise capital in the primary market (UNEP Finance Initiative 2007). Table 6.4 shows some ESG financial products and services in the market.

6.4.3.3 Asset Management

Asset management provides financial advice to clients regarding mutual funds, managed asset programmes, financial planning, international private banking, and other related services (UNEP Finance Initiative 2007). One of the emerging products in asset management is green bonds. According to the green bonds principles, green bonds are instruments applied to finance or refinance green projects following specific principles (OECD 2015). Green bonds finance the

Table 6.3 ESG financial products of retail banking

Product	Region	Institution	Description
Home mortgage	The United Kingdom	Ecology building society	Mortgage rates are discounted for households buildings, sustainable homes, and implementing retrofits and energy efficiency upgrades
	The Netherlands	ING Group	A green mortgage allows an average of 1.5% reduction in interest rate for loans complying with environmental criteria
Loans	The USA	Bank of America (BoA)	BoA will donate to environmental non-governmental organisations if customers use particular credit cards in the environmental home equity programme
		Citigroup	Citi Bank provides customers with readily available and affordable financing options for purchasing and installing solar technologies in their houses
Deposit	China	Bank of China, Hong Kong SAR	Bank of China (Hong Kong) provides personal green deposits to support sustainable projects, including green buildings and renewable energy

Source From the authors' research

Table 6.4 ESG financial products and services of corporate and investment banking

Product/service	Region	Institution	Description
Project finance	The U. S.	JPMorgan Chase & Co. (JPMorgan)	JPMorgan will finance over USD 2.5 trillion to address climate change issues by 2030
Bonds	Ireland	Bank of Ireland	Bank of Ireland issued sustainable finance fund in 2019 and will increase it from EUR 3 billion to 5 billion by 2024
Carbon Finance and emissions trading	Mainly in Europe	Various	Banks provide various financial products to acquire carbon credits, help their clients meet regulatory obligations, provide tradable products, and develop lending products in emission allowances and carbon credits

Source From the authors' research

transition to a low-carbon economy and contribute to the net-zero process through clean and sustainable investment, as the Paris Agreement requires (Gianfrate and Peri 2019). Notably, green bonds have been gaining importance in addressing climate change (Tolliver et al. 2019). The Climate Bonds Initiative (CBI) was founded in 2010 and released the Climate Bonds Standard, which was revised in 2019 (Climate Bonds Initiative 2019). The CBI proposes that climate bonds are designed for the mitigation and adaptation of climate change and support of the UN SDGs other than SDG 13, such as renewable energy, clean water, and innovation (Tolliver et al. 2019).

6.4.3.4 Insurance

Insurance is maintained to reduce risks (Wang et al. 2017). The Principles for Sustainable Insurance (PSI) were put forward in 2012 by the United Nations Environment Programme Finance Initiative to advance sustainable development and cope with global climate change (Bacani 2022). Sustainable insurance helps address climate change in two ways. First, it provides capital flow to promote communities and infrastructure in recovering from nature disasters (Jarzabkowski et al. 2019). The financial burden and risks stemming from the negative impacts of climate change largely fall on individual citizens, organisations, or governments if

there is insufficient insurance (Jarzabkowski et al. 2019; Thistlethwaite and Wood 2018). Second, having insurance deepens the understanding of climate-related risks and introduces measures to increase resilience against climate change. The PSI suggests that the global community develop innovative risk management and suitable insurance products to ensure ESG practice regarding all aspects of sustainable development (UNEP Finance Initiative 2012).

6.4.4 Financial Technology in ESG

‘Financial technology’ (FinTech) is a new phrase describing the connection between finance and technology (Arner et al. 2020). FinTech is being developed due to unprecedented technological advancements, such as big data, artificial intelligence (AI), blockchain, the Internet of things (IoTs), and crowdsourcing. FinTech is being increasingly applied in accounting and finance, particularly in ESG-related decision-making processes (KPMG International 2021).

First, big data is at the core of the ESG decision-making process (KPMG International 2021). Big data analytics refers to analysing enormous quantities of heterogeneous data to rapidly detect patterns, provide valuable insights, and aid in decision-making (Wu et al. 2020). Thus, big data is increasingly applied in ESG activities, such as predicting pandemic outbreaks, reducing carbon emissions, and energy saving (Choi and Park 2022). Strategic managers can allocate resources related to big data analytics to improve overall ESG performance regarding environmental impacts, product quality, human resources, and corporate governance practices (Choi and Park 2022). In addition, investors utilise big data technology to evaluate corporate ESG information that is presented in various forms to make investing decisions efficiently and transparently (KPMG International 2021).

Second, artificial intelligence (AI) technology mimics human cognitive skills and judgement, describes how data can generate actions or optimise the existing process, and is widely adopted in the accounting and finance domains (Munoko

et al. 2020; Schinckus 2020). AI can help companies develop responsible business models and implement the UN SDGs by investing in technology innovation and promoting multilateral cooperation (Di Vaio et al. 2020). Particularly in the accounting field, firms adopt AI in auditing and consulting services to save time, accelerate the process of data analysis, and increase the accuracy, credibility, and usefulness of accounting services (Munoko et al. 2020).

Third, blockchain technology was initially created as the cryptographic basis of Bitcoin (KPMG International 2021). In blockchain, records or data are not uploaded by a particular individual but distributed across all nodes in the network, without any agent to validate the record or transaction (Schinckus 2020). In addition to cryptocurrency transactions, the transformational ability of blockchain allows its application in other fields, such as online voting and digital identity (KPMG International 2021; Schinckus 2020). Liu et al. (2021) suggest that blockchain can be applied to the sustainability reporting framework to facilitate the ESG evaluation of companies by simplifying issues related to raw data authentication, verifying the consistency between raw data and final ESG disclosures, and assessing the ESG performance of companies.

Fourth, the Internet of things (IoT) is designed to develop an interconnected network of intelligent objectives that can sense, communicate, and compute data (Wu et al. 2022). The IoT assembles data from various sources automatically and in real time without manual intervention (de Villiers et al. 2021). The IoT can be leveraged to carry out disclosures of key environmental and social performance indicators by actualising automatic data collection (Wu et al. 2022). The IoT and blockchain make the sustainability reporting process more efficient, secure, and credible than the traditional approach to managing data (Liu et al. 2021).

Fifth, crowdsourcing differs from outsourcing and refers to acquiring services or materials by receiving contributions from a large group of people in the Internet community rather than conventional groups, such as employees,

customers, and suppliers (O’Leary 2015). The principle of crowdsourcing for social accounting is the utility of many individuals willing to contribute their knowledge, skills, and joint efforts to reach a common goal or for mutual gain (Gellers 2016). Corporate information is presented in comparative and transparent accounts through crowdsourcing by independent stakeholder groups (Perkiss et al. 2019). This enables a crowd to contribute information or support for an initiative, such as the realisation of the UN SDGs (Gellers 2016; Perkiss et al. 2019).

6.5 Community

The community covers many stakeholder groups which contribute significantly to social sustainability. This section introduces three stakeholder groups: higher education institutions (HEIs), small- and medium-sized enterprises (SMEs), and non-governmental organisations (NGOs).

6.5.1 Higher Education Institutions (HEIs)

As HEIs, universities have major impacts on the community and play a critical role in ESG practices. The educational mission of HEIs gives them a crucial role in sustainability provision (Dagiliūtė et al. 2018). HEIs have done considerable work to fulfil the objective of sustainability in different ways, for example teaching, campus sustainability, and sustainability reporting.

First, regarding governance and teaching methods, HEIs compile and formulate-related curricula and courses to shape students’ perspectives on sustainability. Some universities are committed to integrating sustainability education into their curricula, but these commitments sometimes do not achieve the intended learning outcomes (Khan and Henderson 2020). To enhance sustainability integration in course planning, programme leaders and administrative staff should adopt a cooperative approach and discuss redesigning and embedding the concept of sustainability into their course curricula (Leal

Filho et al. 2018; Leung and Ng 2019). Implementing sustainability-focused or related courses and research projects requires continuous input and collaboration from various stakeholders, including programme leaders, instructors, students, administrative staff, and industry practitioners in relation to higher education (Khan and Henderson 2020).

Second, HEIs realise sustainability by managing campus buildings (Amaral et al. 2020). University leaders are increasingly focusing on campuses’ environmental impact due to the challenges of climate change (Amaral et al. 2020). Campus sustainability involves many aspects, including green building construction and refurbishment, energy and water consumption, waste management, and transportation (Dagiliūtė et al. 2018). These topics are closely related to the UN SDGs, and campus sustainability can be an ideal communication method to demonstrate sustainability initiatives to students (Žalėnienė and Pereira 2021). Dagiliūtė et al. (2018) suggest that HEIs’ efforts regarding campus sustainability and environmental information determine students’ perceptions of sustainability.

Third, similar to firms, an increasing number of universities, particularly in North America, voluntarily release annual sustainability reports on their websites to show their ESG performance and specific topics related to sustainability (Sassen and Azizi 2018b). Some universities adopt the GRI Standards in compiling ESG disclosures. Particularly in the US, the Sustainability Tracking, Assessment, and Rating System (STARS) provides universities with a framework to disclose additional ESG reports (Sassen and Azizi 2018a). However, sustainability reporting in universities is still in its infancy (Adams, 2013). Sassen and Azizi (2018a, 2018b) find that universities focus on environmental performance, while the social and economic dimensions are less well-covered.

International declarations and initiatives have been launched to promote sustainable development in the agendas of HEIs, for example the Global Higher Education for Sustainability Partnership, Higher Education Sustainability Initiative (HESI), and UNESCO Education for

Sustainable Development (Dagiliūtė et al. 2018; Lozano et al. 2015). For example, the HESI promotes HEIs to implement the UN SDGs through the teaching and learning process in global higher education communities (Higher Education Sustainability Initiative 2022).

Some institutions assess university sustainability performance by releasing HEIs' sustainability rankings (Lauder et al. 2015). The Times Higher Education Impact Rankings (the Impact Ranking) consists of global performance tables that assess universities based on overall and individual UN SDGs. The Impact Rankings in 2022 include 1406 universities in 106 regions (The Impact Rankings 2022). No specific areas or countries dominate regarding compliance with the UN SDGs. Western Sydney University, for example, has the best overall sustainability performance, with outstanding achievement in SDG 6—clean water and sanitation and SDG 12—responsible consumption and production (The Impact Rankings 2022). Quacquarelli Symonds (QS) in the United Kingdom is another institution which provides worldwide university rankings according to different principles, such as employability, research reputation, and internationalisation. In 2022, the QS World University Rankings will provide a new framework to show how universities cope with the most urgent ESG issues. These rankings measure sustainability efforts from student and sector perspectives and help universities benchmark their sustainability progress (Foster 2022).

6.5.2 Small- and Medium-Sized Enterprises (SMEs)

Traditionally, corporate social responsibility is associated with large enterprises or multinational corporations (MNCs), but SMEs have a significant impact on environmental, social, and economic performance (Kechiche and Soparnot 2012; Oduro et al. 2021). Lepoutre and Heene (2006) argue that small businesses are socially responsible in essence, while others contend that a small firm size may result in barriers that limit SMEs' ability to realise sustainability.

Sustainability practices may have different norms in SMEs. For SMEs, the commitment to sustainability is complex, and they need to select appropriate strategies to formulate ESG practices (Dey et al. 2018; Kechiche and Soparnot 2012).

The UN SDGs are relatively ambiguous and need transformation regarding both the public and private sectors. Transformation brings business opportunities for SMEs through the adoption of new business models and application of updated innovation and technology (UN Department of Economic and Social Affairs 2020). For example, SMEs can contribute to the adaption and mitigation of climate change by (i) conducting energy audits and switching to efficient energy, (ii) understanding climate-related risks and bolstering their assets and supply chain with resilience, and (iii) interacting with the community to advance adaptable practices (Dey et al. 2018; Martinez-Conesa et al. 2017).

Policy frameworks are important when SMEs implement sustainability practices, and they affect the ESG performance of SMEs in six ways (Koirala 2018). First, institutional and regulatory frameworks incentivise and support eco-innovators, entrepreneurs, and adopters, helping them address market failures (OECD 2018). Second, fiscal policies allow SMEs to value ESG resources properly. The government can provide subsidies or free technical support to encourage SMEs to move beyond compliance (Dey et al. 2018; OECD 2018). Taxation is another incentive. In Italy, for example, the environmental incentives system for SMEs introduces tax exemptions for Italian SMEs which invest in sustainability (European Commission 2021b). Third, financial support addresses the gap between SMEs and sustainability practices. SMEs may access additional financial resources from external stakeholder groups, such as donors, philanthropists, and international organisations (Oduro et al. 2021). However, there are some specific challenges for SMEs in receiving financing. For example, financial institutions may not have credible ESG data on SMEs, and ESG performance is not considered a material criterion in financing decisions for

SMEs. Few green financing products are solely designed for SMEs (OECD 2018). Fourth, ideal market conditions increase market demand for SMEs and consequently contribute to job opportunities (Kechiche and Soparnot 2012). To achieve beneficial market conditions, SMEs should develop green and sustainable supply chains, participate in the global value chain, and use ecolabels (OECD 2018). Fifth, technical and managerial skills are necessary for SMEs to implement sustainable measures. Finally, knowledge is identified as a major factor between SMEs and large companies regarding the different levels of sustainability management (Hörisch et al. 2015). SME managers should stay informed, gather information about sustainability management tools, and apply them in business operations (Lepoutre and Heene 2006).

6.5.3 Non-governmental Organisations (NGOs)

NGOs are important to the long-term sustainability of human society and drive sustainability practices (Arenas et al. 2009). Global NGOs have made efforts to address the most urgent ESG issues since the 2030 Agenda for Sustainable Development (the 2030 Agenda) was put forward by the United Nations in 2015 (Koshy 2022). This section introduces some NGOs and their approach to promoting the UN SDGs. Table 6.5 provides some basic information about these NGOs.

First, the World Wide Fund for Nature (WWF) aims to preserve natural habitats, slow

nature loss, and promote sustainable production and consumption practices. The WWF mainly focuses on SDGs related to the environment. During the COVID-19, the WWF has aligned all COVID-19 crisis policy responses and economic incentive programmes with SDGs (World Wide Fund for Nature 2020).

Second, the World Economic Forum (WEF) brings together the world's most influential leaders to define global, regional, and sectoral agendas. The WEF aims to transform the sustainable investment ecosystem to accelerate and scale investments towards achieving SDGs in developing countries and emerging economies (World Economic Forum 2022).

Third, the World Resource Institute (WRI) collaborates with governments, business leaders, and civil society to investigate, devise, and implement solutions that improve human society's well-being and safeguard nature's prosperity. The WRI analyses country-specific sustainability issues in its annual report. In 2021, for example, Brazil's most concerning ESG issue was deforestation, while China tended to pay attention to green infrastructure (World Resource Institute 2022).

Fourth, the International Institute for Sustainable Development (IISD) is an independent think tank that provides insights to help address climate change issues, implement sustainable natural resource management, and develop an equitable economy. The IISD delivers sustainability knowledge by (i) focusing on energy, water, and climate change issues; (ii) developing economic regulations and policies; and (iii) offering insightful suggestions regarding the

Table 6.5 Basic information of the NGOs

Time	NGOs	Headquarters	Primary focus
1961	World Wide Fund for Nature	The U.S.	Environment
1971	World Economic Forum	Switzerland	Economy
1982	World Resources Institute	The U.S.	Environment
1990	International Institute for Sustainable Development	Canada	Environment and economy
1993	Transparency International	Germany	Anti-corruption
1995	World Business Council for Sustainable Development	Switzerland	Economy

Source From the authors' research

progress of sustainable development (International Institute for Sustainable Development 2021).

Fifth, the Transparency International (TI) fights against corruption worldwide. The TI sets six strategic objectives to implement anti-corruption practice. First, companies, local authorities, and society should monitor public spending. Second, company owners or controllers must act to prevent money laundering. Third, political integrity should be guaranteed. Fourth, the business community is responsible for business integrity. Fifth, regulators can develop strong legislation to address corruption. Sixth, collective efforts, as encouraged by SDG 17, should be paid for by society to prevent corruption (Transparency International 2022).

Sixth, the World Business Council for Sustainable Development (WBCSD) is led by chief executive officers (CEOs) globally and mobilises the worldwide business community to achieve a sustainable future. The WBCSD issues annual reports to reflect pressing sustainability issues and the response to these issues (WBCSD 2020). The WBCSD collects detailed ESG data regarding its member organisations, analyses these data, and improves the SDG integration of its management framework based on analyses.

6.6 Conclusion

This chapter introduced how ESG is promoted to different stakeholder groups including healthcare service providers, the healthcare industry, accounting and finance professionals, and the community.

In addition to SDG 3, healthcare services can contribute to other SDGs. First, healthcare service providers have provided equitable and accessible education with their professional knowledge and skills in the post and the COVID-19 pandemic period, which has brought about a global learning crisis. Second, the healthcare workforce has more women than in other sectors, and stakeholders are increasingly considering and requiring evaluation of organisations' gender diversity and equality in the leadership of

healthcare service providers. Third, by improving working conditions, the healthcare workforce can contribute to sustainable economic growth. Fourth, peace and social justice are important issues for healthcare services when the COVID-19 and other conflicts are ongoing. Fifth, developed countries can help developing countries address sustainable development regarding public health by providing healthcare professionals.

Second, the healthcare industry can improve ESG performance by referring to ESG ratings, acquiring ESG certifications, and seeking external sustainability assurance. Socially responsible investment induces numerous ESG ratings focusing on different aspects of ESG performance. However, these ESG ratings sometimes lack comparability and effectiveness due to weak regulations in the ESG rating market. Some regulators have begun to draft standards to supervise institutions providing ESG data and ratings. Additionally, ESG certifications help organisations implement ESG strategies with expert knowledge and ESG management tools. External sustainability assurance adds credibility and accountability to corporate sustainability reporting. Assurance providers' specialisations, types, and experiences with clients affect the quality of sustainability assurance, and an assurance service focuses on specific aspects of ESG performance.

Third, accounting and finance professionals align with sustainability in accounting practice, ESG financial products, and the FinTech application. For accountants, accounting and reporting on biodiversity and carbon emissions have been critical issues. Both international NGOs and market regulators are increasingly focusing on these emerging topics. For financial institutions and professionals, different financial service departments provide opportunities to promote sustainable investment, help build resilience against climate change, and contribute to economic prosperity. With the application of FinTech, the process of sustainability reporting increases ESG decision efficiency and improves information transparency.

Fourth, universities, SMEs, and NGOs have different norms for ESG practice. Universities

design sustainability-related courses and research projects to cultivate students' consciousness. Some universities in North America release voluntary sustainability reports adopting international reporting standards as frameworks. SMEs adapt updated business models and innovative technology to equip themselves with necessary sustainability knowledge. Policies can be developed to support ESG practice in SMEs, including institutional and regulatory incentives, fiscal policies, financial resources, accessible markets, skills, and knowledge. NGOs implement and realise the UN SDGs from different pillars but call for collective efforts in general.

In addition to the stakeholder groups mentioned in this chapter, other stakeholders are related to sustainable development. As required by the UN SDGs, the realisation of long-term sustainability requires global cooperation from every individual. Future research could investigate how other stakeholder groups implement ESG practice.

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Recent Trends of Research and Education in ESG and Sustainability

7

Abstract

Sustainability, a concept originating from the ecological and environmental systems, is a critical topic receiving significant interests and discussions among various stakeholders including researchers, managers, and practitioners. Literature findings have supported that sustainability is associated with the enhancement of competitive advantages of companies. Strategic approaches incorporating the environmental, economic, and social issues in business operations have been extensively investigated and developed for firms to achieve development goals for sustainability. Meanwhile, the principles of sustainability have been adopted with the aim of sustainable supply chains and business systems, leading to a surging number of research studies exploring the sustainability performances of firms with the use of ESG scores. Results from various investigations have also identified the important indicators or score systems for evaluating the ESG sustainability performance of firms. Furthermore, in the past years, the relationship among corporate social responsibility (CSR), environmental sustainability, social responsibilities, and ethics in organisations has been frequently discussed by academics, businesses, and political leaders. With growing concerns on the deteriorating environmental quality, various studies have reported on the findings of researches

regarding the incorporation of corporate sustainability in strategic management, as well as the integration of corporate social responsibility (CSR) and sustainable development in business programme curriculum. In this chapter, relevant studies in the mentioned domains will be reviewed for gaining further insights into the research and education in ESG and sustainability in the business and their application in healthcare.

Keywords

Sustainability • Green supply chain management • Environmental sustainability • Corporate social responsibility • Education for sustainable development • Virtual reality

7.1 Introduction

Sustainability is a global topic of significant interest and has attracted tremendous attention from various stakeholders including governments, business leaders, professionals, academicians, practitioners, managers, and customers. The concepts of sustainability are originated from the environmental and ecological systems, with the term sustainability referring to the ability to adapt to evolving environments (Seuring and Müller 2008). Literature findings have indicated that sustainability can lead to the enhancement of competitive advantages of

business firms or organisations. Adopting an integrative approach for the environmental, economic, and social issues in operations, the principles of sustainability have been widely applied in supply chain systems, leading to the evolution of the concepts of sustainable supply chain management (Rajeev et al. 2017). There are three major dimensions, namely environmental, economic, and social, for the assessment and evaluation of sustainability performances of firms (Rajesh 2020). Sustainable supply chain management (SSCM) is a strategic integrative approach to achieving profitability while improving environmental performance by reducing emissions and waste generation, as well as addressing many societal issues and concerns (Touboulic and Walker 2015). To minimise the impacts of business operations on the environment, green supply chain management (GSCM) has emerged as a popular concept, in particular during the recent years when the public awareness and demand for a sustainable environment have further intensified.

In the following sections, the major issues associated with environmental sustainability and GSCM, as well as research development of GSCM in different sectors and relevant implications, will be described. In addition, research in corporate social responsibility (CSR) and ESG scores, as well as recent examples of educational studies in business and management education, will be discussed in relation to ESG and sustainability.

7.2 Environmental Sustainability and Green Supply Chain Management (GSCM)

In the past decades, pollution to the environment has remained as one of the greatest global challenges. Recently, increasing awareness on environmental sustainability has led to growing concern over business activities leading to industrial emission of carbon monoxide, discarded packaging materials, scrapped toxic materials, and discharge of hazardous effluents. Rising levels of chemical pollutions and global

warming have led to increasing deterioration of environment. The declining environmental quality has caused particular concerns in recent years with a significant growth of the ageing population and a clean sustainable environment is considered an essential component for the promotion of healthy ageing (Fong et al. 2021). As a result, there has been growing pressure from the general public and regulatory measures on firms and organisations to enhance environmental performance and reduce the negative impacts of business operations on the environment (Chin et al. 2015; Diabat and Govindan 2011). Supply chain is an important component in operations management, and the network is composed of all parties, such as supplier, manufacturer, distributor, wholesaler, retailer, and customer, which are directly or indirectly involved in the production and delivery of products or services to customers (Tseng et al. 2018; Zhu et al. 2008). Significant disruption to the environmental quality can arise from the supply chain network of business organisations and firms. Therefore, significant emphasis should be placed on the supply chain network to address the environmental degradation by integration of environmental concerns into supply chain operations and management practices (Fang and Zhang 2018; Yu et al. 2014).

To minimise the impacts of business operations on the environment, green supply chain management (GSCM) has emerged as a popular concept since the early twentieth century and is still attracting significant interests from both the academics and practitioners, with a number of empirical studies in GSCM increasing considerably over the recent years (Bhatia and Gangwani 2021; Fahimnia et al. 2015). Although sometimes being used as interchangeable, GSCM and SSCM represent two distinct concepts. SSCM can be viewed as an extended term of GSCM, with GSCM being more closely and specifically related to the environmental characteristics and practices, while SSCM is associated with environmental, economic, and social characteristics in relation to various stakeholders (De Oliveira et al. 2018). The concepts of GSCM are important for the integration of environmental thinking and concerns in the practices of supply chain

management, as well as mitigation of negative environmental impacts caused by supply chain activities. Proper implementation of GSCM in operations will lead to performance enhancement in sustainability since GSCM is expected to assist organisations in the development of strategic measures leading to higher profitability level by reduction of environmental risks and improvement of environmental efficiency (Khorasani and Almasifard 2018). With the rapidly growing empirical research, periodic literature review is important for business professionals and industrial practitioners to have updated understanding of conceptual and mathematical investigations, as well as for researchers to assess the study progress and develop future research directions regarding GSCM (Soni and Kodali 2012; Bhatia and Gangwani 2021).

7.3 Research Development in GSCM and Implications

GSCM is an important management and organisation philosophy for reduction of environmental threats while achieving operational performance and improving ecological efficiency of the firm. Significantly rising attention on environmental sustainability has led to increasing demand from customers for greener products and services, as well as pressures from various institutions and stakeholders, which have driven firms to action ethically and responsibly to the environment through the implementation of GSCM practices (Fang and Zhang 2018; Green et al. 2015). In recent years, there has been significant increase in the amount of research studies on GSCM which reported findings on the development of GSCM optimisation models, the drivers and barriers to the implementation of GSCM practices, investigations of collaboration with supply chain partners, and assessment of GSCM practices and performance indicators.

There is a growing trend of studies focusing on the development of mathematical models to improve the economic and environmental performance through the adoption of strategic

decision-making processes which are based on the presented models (Tseng et al. 2019). Researchers have proposed different models for identifying problems, monitoring situations, and prescribing solutions. A recent study by Mohtashami et al. (2020) has presented a comprehensive closed-loop green supply chain model with reverse logistic consideration to achieve decreased consumption of energy and negative environmental impacts due to transfer of goods by the transportation fleets between different supply chain's centres. Meanwhile, Jemai et al. (2020) have reported the design of a multistage GSCM model for blood platelets. Due to their highly perishable nature, blood platelet products require effective SCM integrated with environmental concepts. The study aims at minimising duplication and wastage by implementing efficient decision-making about the allocation of blood facility locations, as well as developing an efficient network for the logistics of blood platelet products (Jemai et al. 2020). The design of the model was incorporated with green practices to support a dynamic SCM in the healthcare field for reducing carbon emissions and sustaining a green collection and delivery of blood platelets. Jemai et al.'s (2020) study used computational tests to evaluate and validate the model with consideration of a case study in Ansan, a South Korea City. The formulated model helps to develop an effective transportation network for efficient processes of collection and delivery. Efficient allocation of blood facilities with optimum locations supported by effective transportation network would result in reduced carbon emissions (Jemai et al. 2020). More importantly, timely supply of blood platelets is a matter of life and death to the needy ones. The presented model in the study provides a framework for the mapping of each mobile blood facility and the corresponding locations to be visited, the allocations of permanent blood facilities, quantity of platelets for daily collection, the recommended route for each transportation vehicle, and number of hospitals to be visited in each trip (Jemai et al. 2020). The findings support that the model can facilitate the management of waste generation in

an example of the healthcare sector and contribute to benefit the environment through a dynamic GSCM.

7.3.1 GSCM in Pharmaceutical and Healthcare Industry

Likewise, GSCM is very important in the pharmaceutical industry, especially when considering the rapid growth of the pharmaceutical industry. In fact, it has been reported that among all types of healthcare products, drugs account for approximately 20–30% of the global health expenditure (Narayana et al. 2014). Therefore, possible environmental impacts of materials, products, and services in pharmaceutical industry can be profound and hazardous. The negative consequences to the environment can be caused in various ways, including the inappropriate disposal of pills, tablets, and expiry of medications (Kumar et al. 2019). Domestic sewage and discharge of effluent from pharmaceutical manufacturing plants containing drug residues contribute to chemical pollution with serious threats to the aquatic environment and quality of drinking water (Chiu and Fong 2022). Since pharmaceutical products and services are closely and specifically linked to the public, the supply chain has a critical role in the distribution of materials or drugs to various stakeholders in the pharmaceutical sector and integrating GSCM initiatives would be fundamental for the transformation towards an environmentally and socially responsible industry (Moktadir et al. 2018; Shakeri et al. 2020). Kumar et al.'s study (2019) has identified the potential risks in the adoption of GSCM initiatives in the pharmaceutical industry through literature review and fuzzy Delphi method. The identified risks were classified into different categories, such as operational, government and organisational, environmental and technology risks. The categorised risks were further prioritised for effective GSCM using the fuzzy analytic hierarchy process (Kumar et al. 2019). The research study thus presents a benchmark model for company managers and government authorities to develop

effective management of GSCM initiatives which are important to the sustainable development of the pharmaceutical industry (Kumar et al. 2019). Furthermore, healthcare SCM also plays a critical role in disaster preparation, response, and relief. A novel multiobjective model incorporated with green concepts has been proposed in pharmaceutical supply chain for natural disaster response (Zavvar et al. 2017). The objective functions optimised in the new model include minimisation of total manufacturing costs, such as production costs and transportation costs, minimisation of adverse impacts of products and transportations on the environment, as well as maximisation of humanitarian forces. With many significant environmental and operational issues that have to be dealt with during the event of a disaster, the design of a pharmaceutical GSCM model is valuable for determining the optimal costs for medical commodity and distribution processes, with the aim of making continuous improvement on the effectiveness and efficiency of healthcare supply chain for natural disaster management. More importantly, more future studies should be directed to the integration of disaster data and application of the models which aim at solving real-life healthcare supply chain problems in natural disaster preparation and management, addressing the challenges from reduced funding for humanitarian efforts and disaster relief, as well as optimising pharmaceutical supply chain operations.

7.3.2 GSCM in Steel Industry

In addition to the healthcare sector, GSCM in the steel industry has also attracted considerable research interests. This is explained by the significant contribution by the industry to pollution of the environment, leading to the particular need for implementation of GSCM for minimising waste generation and hazardous emissions (Khorasani and Almasifard 2018). Khorasani and Almasifard (2018) reported a study focusing on the design of a fuzzy dual-objective model for a green supply chain system in steel manufacturing. The developed model is novel in the way

that by using facility programming, it allows the insertion of uncertainty of parameters such as customer demand, production, and casting capacity in the GSCM network (Khorasani and Almasifard 2018). Further research and investment are essential to focus on both the dynamic interactions and uncertainty of various parameters in the supply chain system. In recent years, a growing trend has been shown for research studies on green supplier selection in the steel industry which aims at reducing costs, saving resources, and mitigating impacts on the environment (Gupta and Barua 2017; Javad et al. 2020). Overall, papers related to optimisation models for GSCM have increased significantly in recent years while most of them focus on improvement of environmental and economic performance (Bhatia and Gangwani 2021). Further development of optimisation models is important to practitioners for decision-making and real-life problem-solving when implementing GSCM practices. The emergence of optimisation models comes as no surprise in view of the rapid growth of the GSCM discipline and adoption of GSCM practices, leading to more sophisticated relationship and interactions between different supply chain partners.

7.3.3 GSCM in Chemistry Industry

Recently, Gao et al. (2021) have proposed a multicriteria decision framework describing twenty guiding practices for effective enactment of GSCM by firms in the chemical industry. The study has identified the critical factors for successful implementation of GSCM based on a hierarchical model integrating corporate official website information, such as company profile, business operations, and others related to corporate performance and strategies. It was reported that the major constituents of the underlying GSCM structure include environmental management, ecodesign, recycling of resources, economic initiatives, and stakeholders. The

findings of the study further demonstrate that the integration of aspects of environmental management, ecodesign, and recycling of resources should be prioritised for effective implementation and development of GSCM. Moreover, the top practices identified include support from senior management, conduction of life cycle assessment, environmental risk management, advancement of technological applications in recycling, and integration of reverse logistics. Implementation of GSCM practices can lead to improvement in environmental, social, economic, and operational performance. Among the performance factors, the more extensively studied constructs are environmental performance and economic performance (Bhatia and Gangwani 2021). To measure economic performance, reported items used for assessment include saving of economic cost, new market opportunities, and level of profitability (Zhao et al. 2017). Notably, Zhao et al.'s (2017) represents one of the few examples capitalising model parameters through big data analysis. With the scarcely reported studies, more research on the use of big data for evaluation of GSCM should be conducted in future. Regarding the measurement of environmental performance, considerations have been based on pollution prevention and minimisation of waste generation, as well as the mere adoption of environmental performance items (Zhu et al. 2012). Over the years, many studies have evaluated the environmental impacts based on Toxic Release Inventory (TRI) data (Ahi and Searcy 2015; Bhatia and Gangwani 2021). At the same time, it is considered that future research should be based on data collected from multiple sources. Mere reliance on single item, such as TRI may not be sufficient for a full capture of environmental impacts and performance. TRI data can reflect the emissions in the production processes; however, mere reliance on the use of TRI for measuring environmental performance may lead to overlook of other factors, such as the loss of green space in the building of manufacturing factories (Pagell and Shevchenko 2014).

7.3.4 Collaboration with Supply Chain Partners

Many studies have discussed the importance of collaboration with supply chain partners for successful implementation of GSCM. Collaboration with various supply chain partners, such as suppliers, customers, and logistics service providers is reported to lead to improvement of environmental performance (Tseng et al. 2019). Zhu et al. (2017) have found that cooperation with customers is required for the improvement of environmental and economic performance. In the meantime, the findings from the study conducted by De Sousa Jabbour et al. (2017) in Brazil supported the benefits of cooperation with customers on the environmental and economic performance regarding green purchasing. Besides, studies have reported the improvement of environmental performance through the collaboration with logistic service providers. The findings suggest that cooperation with logistics companies in GSCM implementation can mitigate emissions of greenhouse gases, leading to improvement of environmental performance (Ameknassi et al. 2016; Entezaminia et al. 2017). Overall, growing studies related to the collaboration with supply chain partners have suggested the importance and benefits on the environmental and economic performance. Enhanced relationship with the suppliers, customers, and logistics service providers can facilitate the implementation of GSCM and mutual achievement of economic and environmental goals. Furthermore, there is limited research investigating the relationship of GSCM, green innovation, and environmental performance (Seman et al. 2019). Green innovations are of significant values for the implementation of GSCM with novel ideas and approaches. It was emphasised that green innovation strategies can boost capabilities of firms in capitalising green opportunities through different innovative production processes, leading to development or improvement of new business models (Zhang et al. 2022). Seman et al. (2019) conducted a study to investigate the effects of GSCM and green innovation on the improvement of environmental performance,

aiming for realisation of the relationship between GSCM, green innovation, and environmental performance. The validated model presented in the study demonstrated that enhancement in organisational environmental performance can be achieved due to the successful implementation of GSCM and green innovations.

7.3.5 Social Performance

Notably, while the environmental performance and economic performance have been frequently studied, more investigations should focus on the social performance construct as many stakeholders, such as the general public, non-governmental organisations (NGOs) and governments may have more interests in the environmental and social impact, rather than the economic performance (Mani et al. 2018; Pagell and Shevchenko 2014). Therefore, measurement of social performance is also important to the sustainability of GSCM. Areas for further explorations include the effects of GSCM implementation on the improvement of the well-being of local communities and the quality of life of employees. Furthermore, due to the contextual and evolving nature of performance measures, periodic measurement of social performance in the form of cross-country comparisons is suggested (Bhatia and Gangwani 2021; Yawar and Seuring 2017).

7.3.6 Drivers and Barriers of Research

Regarding the research in GSCM, there are studies related to the identification and analysis of drivers and barriers to the implementation of GSCM. Drivers refer to the factors that give pressures to firms and organisations for the implementation of GSCM practices. These driving factors include the pressure stemmed from regulations, market competitors, and stakeholders due to increasing awareness and concern over environmental sustainability (Huang et al. 2017). Drivers play an important role for motivating the implementation of GSCM, and the presence of

these driving forces has strong influences over the firms to adopt the measures for improving environmental performance (Diabat and Govindan 2011; Tseng et al. 2019). On the other hand, there are barriers which hamper firms to implement GSCM. Dube and Gawande's (2016) study has analysed barriers to GSCM implementation by literature review and consultations with industrial practitioners and researchers. The barriers identified include the lack of senior management support and commitment, lack of training and expertise in GSCM, reluctance to adopt the emerging technologies, and financial constraints. The contextual relationships among the barriers were also identified and analysed by the development and adoption of an interpretive structural model. In the context of Indian industries, Govindan et al. (2014) have identified 47 barriers through literature review and discussion with industrial practitioners, as well as analysis of results through a survey delivered to different industrial sectors. Among the identified barriers, concerns over technological adoption, difficulty of outsourcing, financial constraints, lack of environmental knowledge, and insufficient support from stakeholders represent some of the influential examples. Notably, it has been reported that a considerable portion of research in GSCM has focused on investigating the benefits of its implementation and relatively, a small number of studies have examined the barriers to the implementation of GSCM (De Oliveira et al. 2018). Therefore, future studies contributing to overcome or reduce the barriers to GSCM implementation are worth investigating for the development of relevant measures to facilitate the implementation of GSCM.

Furthermore, it has been reported that GSCM research covering the field of health and education is not widely studied despite their importance to the sustainability of societies (De Oliveira et al. 2018). Some important topics, such as recycling, which have significant impact on the mitigation of environmental impacts, are of limited amount and further investigations in the context of GSCM are worth conducting. Meanwhile, it is noteworthy that a large portion of reported studies has focused on large

enterprises and considered big companies as sample for data collection (Jo and Kwon 2021; Tseng et al. 2019). In future, more research should be conducted to examine the effects of GSCM implementation on small and medium enterprises (SMEs). They should be considered and engaged in collaborations for environmental protection to achieve greater processes towards a sustainable future.

7.4 Research in Corporate Social Responsibility and ESG Scores

Corporate social responsibility (CSR) has been a major research agenda, and there has been increasing demand of developing a socially and environmentally responsible corporate sector. With more attention being paid to a company's efforts in environmental issues, ethical labour practice, and corporate governance, CSR is considered one of the important factors affecting business success (Javaid Lone et al. 2016; Tamimi and Sebastianelli 2017). When more companies are interested in measuring and reporting sustainability performance, effective and consistent measurement, analysis and assessment of sustainability metrics are essential. Many empirical studies have been conducted in recent years to measure the sustainability performance of firms based on ESG scores. Tamimi and Sebastianelli (2017) examined corporate transparency on the three dimensions of ESG through analysis of Bloomberg ESG disclosure scores. The areas assessed or metrics examples contributing to the ESG scores include emissions of greenhouse gases, usage of electricity, amount of waste discarded, environmental certifications, policies against child labour, anti-bribery measures, size, average age, and gender of board of directors. The findings of the study support that factors related to governance have significant impact on ESG disclosure scores, which are consistent with the results from other relevant empirical studies (Frias-Aceituno et al. 2013; Javaid Lone et al. 2016). In addition, it was found that firm size is a critical moderator variable, which revealed that companies with greater

market capitalisations had higher ESG disclosure scores. The association of market capitalisation with transparency in ESG reporting can be explained by the fact that large firms in general are better structured for promoting external communications and reporting about CSR (Baumann-Pauly et al. 2013).

7.4.1 Digital Technologies and CSR

In recent years, there has been a rapid growth for the adoption of various digital technologies in the business sector primarily due to their operational and economic benefits, as well as the critical roles they play in this era of digitalisation and Industry 4.0 (Frank et al. 2019; Ivanov et al. 2016; Müller et al. 2018). However, at the same time, this growing trend of technology adoption has caused controversial debates as it is argued that digital technologies can lead to undesirable consequences on the environment and society (Cardinali and De Giovanni 2022; Liu and De Giovanni 2019). Empirical findings have indicated that digital technologies can give adverse effects on both the environmental and social spheres. For example, in agriculture, investment in robotics can have benefits on the environment due to the reduction of production wastes. However, it has been estimated that a crop-harvesting robot can replace up to 30 human workers (De Giovanni 2021). In addition, production systems utilising robotics and big data may become highly capital-intensive, leading to an overall higher energy consumption. Big data manipulation in data centres may require an annual energy consumption which is larger than the total energy consumption of some countries. Moreover, it has been suggested that companies need to conduct a comprehensive analysis of the strategic behavioural changes required for proper selection and adoption of digital technologies (Ivanov et al. 2016; Saberi et al. 2019). They need to perform an accurate estimation of their economic outcomes, as well as a meticulous assessment of the implications for the whole ecosystem.

Furthermore, the concept and theoretical framework of responsible digitalisation has been developed in relation to the firms' capability of achieving their CSR goals by the adoption of digital technologies (De Giovanni 2021). It is important that companies do not focus on merely improving economic performance when adopting digital technologies. Accordingly, firms are responsible for carefully evaluating the implications of digital technologies in consideration of the impacts on the environment and social targets. Cardinali and De Giovanni (2022) have investigated the relationship between adoption of digital technologies and CSR to provide insights for achieving responsible digitalisation. The benefits of implementing environmentally responsible strategies were further explored. These examples include innovations of green process and energy-saving process, green packaging, and circular economy. In fact, environment-based strategies can turn out to be very effective in tackling important challenges from an economic perspective as well. For example, developing green chemicals to mitigate industrial waste can save cost for developing new technology to treat the effluent or reduce expensive implementation. The twelve green chemistry principles are fundamental and indispensable for developing new processes, materials, and ingredients (Anastas and Eghbali 2010). They are important for re-evaluation of existing processes and chemicals which are necessary for sustainable development. The commitments to advancing the knowledge and applications of green chemistry are founded on CSR which allow analysis and assessment throughout the life cycle of products (Philippe et al. 2012).

7.5 Sustainable Development in Business Education

The concept of sustainable development is important for promotion of good health and well-being. Education for sustainable development has been advocated and launched as one of the key strategies to deal with challenges against

sustainability. The global adoption of education for sustainable development as a consequence of the United Nations Decade for Education for Sustainable Development (2005–2014) has been reshaping curricula across different disciplines around the world (Boeve-de Pauw et al. 2015; Wu and Shen 2016). Meanwhile, there has been a rapid growth of educational studies addressing a sustainable future and marking innovations in the design of educational resources for a sustainable environment (Chiu et al. 2022). Significant examples have been reported in business and management education. Universities have received growing recognition and institutional support for their critical roles in addressing major issues of sustainable development (Setó-Pamies and Papaoikonomou 2016). Through integrating the concepts of sustainability and ethics principles in the curricula, universities could offer their knowledge and skills regarding the changes, systems and requirements of the new business paradigm while broadening and enhancing students' moral imagination (Fougère et al. 2014). In this regard, universities are important pillars contributing to more sustainable development through providing the knowledge, skills, and training to students who will later put them into practices both in the roles as professionals, practitioners, and consumers (Kelley and Nahser 2014; Setó-Pamies and Papaoikonomou 2016). Academic institutions need to offer the required competencies to future business leaders who would contribute to a sustainable future without giving harm to the environment and society (Godemann et al. 2014).

In the context of educational studies regarding sustainability, it is essential to acknowledge the variety of terms used for similar and relevant concepts. It has been reviewed that the terms, such as business ethics, CSR, and sustainability have been some of the most commonly used terms in the literature (Christensen et al. 2007; Setó-Pamies and Papaoikonomou 2016). Principles for Responsible Management Education, the United Nations' voluntary global initiative, were launched in 2007 with the mission to achieve enhancement and extension of corporate responsibility and sustainability in mainstream

business education. The initiative was considered to have played a pivotal role in catalysing the transformation of management education for meeting the increasing demands from the society for a responsible economy (Haertle et al. 2012; Solitander et al. 2012). An exploratory study analysing the MBA curriculum at the top 50 business schools in the United States was carried out by Okpara et al. (2013). The study found that totally 20% of the sample offered CSR as a stand-alone subject while in 18 schools, these stand-alone CSR subjects were compulsory (Okpara et al. 2013). It is noteworthy that universities are expected to provide a multilevel learning environment with a variety of message sites for students' holistic learning and socialisation processes (Blasco 2012). Embracing the sustainability values should be encouraged both inside and outside the classroom. Therefore, merely integrating the concepts of CSR, sustainability, and ethics principles in academic curricula is not sufficient. More investigations and research study are necessary to apply the most effective teaching and learning methodologies for integrating these elements at a more strategic and institutional level. In the study by Setó-Pamies and Papaoikonomou (2016), the model for integrating ethics, CSR, and sustainability in management education was proposed, encompassing three interdependent levels of analysis which are the curricula, institutional, and instrumental levels. The curricula level means the integration into the programme curriculum. The instrumental level refers to specific pedagogy and learning tools, and that the institutional level refers to the implementation of a sustainability-oriented culture supporting the corresponding learning processes. Based on an extensive review, the major issues that need to be considered in each level were identified to provide an integrative and holistic approach for guiding the relevant integration in business education, with the aim of improving students' knowledge, and attitudes towards sustainable development.

Furthermore, advancement of technology has led to a surging number of studies investigating the use of digital technologies across different disciplines, including engineering,

entrepreneurship, health, and science education (Li 2018; Secundo et al. 2020; Kyaw et al. 2019; Chiu 2021). An increasing trend of adopting digital technologies is observed in business education integrated with business ethics and CSR in teaching. Learning activities using real situations may involve expensive implementation, high costs, limited infrastructure, and equipment. They are usually not sustainable and may even incur high risks. In addition, as the new generations grow up in the digital age, learning media incorporated with digital technologies may be more attractive and motivating to them (Sholihin et al. 2020). In recent years, increasing studies have reported the use of learning media based on virtual reality in the teaching of business ethics where challenges in ethics education include the gap between ethics principles and relevant applications in the real world (Venkat Raman et al. 2019). Augmented or virtual reality applications in education have been reported to have rich educational potentials such as provision of interesting visual and audio information to enhance interaction and enhancement of students' motivation for a better understanding of abstract concepts and their applications in daily life (Jong et al. 2020; Wong et al. 2021). The use of these digital technologies can facilitate students to explore cause-and-effect relationships of actions in an interactive manner and aid in behavioural training. Sholihin et al.'s (2020) is one of the examples utilising virtual reality-based learning environment in the teaching of business ethics. This study serves as a response to the unprecedented situation caused by the COVID-19 pandemic as virtual technology can offer a good learning media to keep learning at home during the pandemic and students' user experience and perceptions towards virtual reality-based learning media for business ethics have been investigated (Sholihin et al. 2020). The findings support the benefits of virtual reality-based ethical learning such as enhanced ethical efficacy due to increased self-efficacy.

In addition, pedagogy of teaching business ethics using educational games incorporated with immersive experience was reported. Jagger et al.

(2016) conducted a study to evaluate the effectiveness of a visual case experience provided by an immersive three-dimensional simulation game as part of a mandatory business ethics module at two universities in the United Kingdom. In the study, an immersive three-dimensional game was designed and delivered in the form of a visual case. The effectiveness of the educational game was investigated adopting a mixed-methods approach in which recognised and adapted constructs from the technology acceptance model (TAM) were measured (Jagger et al. 2016). It was reported that students in general found the educational game beneficial to their learning of ethics, with knowledge, and skills learnt applicable to the real situations. The engagement of students was found to be enhanced due to the presence of game elements. The study represents a valid example demonstrating the good potential of using simulation games as a pedagogy to teach ethics supported with a visual case model.

Recently, Hadi et al. (2022) have applied augmented reality in the development of a mobile game to improve students' competency of making ethical decisions in the accounting sector. The mobile application was developed based on revenue recognition case in an Indonesian state-owned leading airline company. The results show that the intention to use the application is affected by the perceived ease of use via the perceived usefulness of the application and users' attitude towards the mobile application (Hadi et al. 2022). Further suggestions of future work include the development of more interactive learning media and evaluation study on whether the interactive elements of augmented reality-based ethics learning environment would be influential to students' cognitive style and attitudes (Hadi et al. 2022). It is noteworthy that using digital technologies in teaching and learning comes with challenges. Students may feel academic pressure under intensive digital learning while both physical and mental health may also be severely affected due to long time exposure to digital devices (Zis et al. 2021). Meanwhile, the use of digital technologies leads to concerns over digital inequality, while teachers' competency and readiness in adopting new

technologies would need to be addressed (Chiu 2021). Moreover, digital devices can be facilitators of other important pedagogical practices such as active learning (Magrizos 2020). These are important factors to be considered during the design and implementation of teaching practices incorporated with new technologies.

7.6 Conclusion

Extensive investigations regarding GSCM have been conducted in recent years. Its research development has been illustrated with selected examples in pharmaceutical industry, healthcare industry, steel industry, and chemistry industry. These examples are further discussed in relation to sustainability. Although GSCM is of high potential contributing to sustainable development, significant barriers to the implementation of GSCM also exist. Future work directions have been discussed with relevance to the identified issues. In addition, recent research studies regarding CSR and ESG scores have been highlighted. Further discussions on the adoption of digital technologies in the research and education of CSR have been made to provide insights for moving towards sustainable development.

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SDG 3 and ESG—Linkage and the Way Forward

8

This book has focused on the relationship between environmental, social, and governance (ESG) and sustainable development in healthcare. Particular emphasis has been put on the association of ESG with Sustainable Development Goal 3 (SDG 3), which aims to promote good health and well-being. SDG 3 includes thirteen targets which cover a variety of important goals regarding sustainable health. The targets address critical issues, such as population health, communicable and non-communicable diseases, health insurance, essential medicine and vaccines, accessible and equitable healthcare services, as well as a clean environment for good health and wellness. Each chapter in this book discusses relevant issues with perspectives from ESG and sustainable development in healthcare.

Chapter 2 discusses the origination of ESG concepts and how relevant reporting standards have evolved in the past decades. The Global Reporting Initiative (GRI), the Carbon Disclosure Project (CDP), the Sustainability Accounting Standards Board (SASB), and the Task Force on Climate-related Financial Disclosures (TCFD) have been discussed with relevance to sustainable development. In addition, the explanations of ESG reporting regulations, guidelines, and theories contribute to the understanding of how sustainability accounting frameworks and reporting standards have emerged as effective tools for the standardised disclosure of ESG information, as well as the evaluation of corporate performance and ESG practices in relation to

SDGs. Moreover, discussions on the examples regarding ESG reporting regulations and guidelines in various Western and Asian countries provide a comprehensive account of sustainability reporting across different regions. The details constitute a fundamental background for subsequent discussions in other chapters, including the illustrations on the environmental pillars classified by SASB and relevant examples of ESG applications in healthcare, as discussed in Chap. 4. The latter part of Chap. 2 focuses on ESG reporting theories. An overview of various reporting theories, such as agency theory, legitimacy theory, signalling theory, institutional theory, stakeholder theory, and voluntary disclosure theory is presented to facilitate the understanding of ESG practices with relevance to sustainable development in business operations.

Chapter 3 specifically addresses important issues related to SDG 3 in healthcare. Universal Health Coverage, the main focus of Target 3.8 in SDG 3, is discussed in relation to the concepts of safeness, effectiveness, quality, and affordability in medication and vaccination. The challenges in the achievement of universal health coverage presented in this chapter reinforce the need for further research regarding essential medication and vaccination, as emphasised in Target 3.B. Discussions on the development of effective information systems and experience are related to the achievement of Universal Health Coverage and other SDG 3 targets as well. SDG 3 emphasises the importance of improved access to

quality healthcare services. In this regard, the importance of public health insurance and the failure of different health insurance schemes have been highlighted. It has been discussed that improvement in the dissemination of information, education, and communication would result in an increased rate of participation in health insurance programmes, as well as enhancing the attainment of SDG 3 targets addressing Universal Health Coverage and improved access to healthcare services. Meanwhile, experience drawn from relevant studies related to the voluntary national reviews provides insights into the adoption of digital health technologies for the attainment of SDG 3 and its associated targets. In this regard, the growing trend of digital health has been highlighted and various digital health technologies have been described. Examples include mobile health, telemedicine, and electronic medical records, with which further research and development in the innovations and utilisation of digital health technologies would be critical for the attainment of SDG 3 targets. The chapter further describes reported examples of digital health technologies in healthcare, including information systems for pharmaceutical management, regional dashboards for early warning systems addressing potential shortages of HIV health commodities, monitoring systems for pharmacovigilance, and electronic tuberculosis reporting systems. These examples further illustrate how using digital health technologies would contribute to improved patient care and strengthened surveillance on reporting of disease treatment, linking up with SDG 3 for promoting good health and well-being. For example, regional dashboards could serve as an early warning system for potential stock-outs of medications and vaccines, thereby ensuring a steady and reliable supply of drugs and vaccines, which is of particular importance regarding SDG 3 targets, such as 3.8 and 3.B. Despite the reported benefits and versatility, more academic studies on the applications of digital health technologies are necessary while regular review on the applications of digital technologies in healthcare is important for monitoring the progress towards SDG 3. Applications of digital technologies for

improving access to quality healthcare services have further been discussed with reference to situations in conflict-affected regions where people living in these areas are facing significant health challenges. Furthermore, the importance of a green environment for sustainable health is discussed in relation to SDG 3 target 3.9, which aims to substantially reduce diseases and deaths by mitigating the use of hazardous chemicals and pollution to the environment. The correlations with SDG 3 targets have further been illustrated with discussions on the increasingly reported studies which investigated sustainability transitions, green innovations, and business model designs. Chapter 3 discusses the impact of COVID-19 on the attainment of SDG 3, with a variety of health-related targets. Important issues arising from disposal of used masks, chemical wastes, depletion of healthcare workforce, and systems have also been discussed. The significance of research on essential medications, as mentioned in SDG 3 target 3.B, is further advocated while the development of a systematic approach to address challenges brought by COVID-19 on the healthcare system is urgently needed. On the other hand, the opportunities created by the pandemic have given rise to innovative approaches to online teaching subjects in different disciplines. The promising applications of digital technologies during COVID-19, such as augmented health interventions, public health education, and facilitated communication, are discussed with linkages to SDG 3. Overall, collaborative efforts and contributions from various stakeholders, such as healthcare practitioners, academicians, and researchers in different disciplines, organisations, the government, and the general public are indispensable for further innovations and utilisations of emerging technologies for long-term sustainability.

In Chap. 4, applications of ESG in healthcare are discussed in relation to each pillar of ESG. Regarding the environmental pillar, ESG practices in terms of waste generated from different healthcare activities, energy consumption, and climate change due to greenhouse gas emissions from the healthcare industry, are described.

Discussions on the social pillar focus on several specific topics in healthcare, such as product and service quality, supply chain social responsibility, workplace safety and employee relations, and data confidentiality and security. The section on healthcare innovation during the COVID-19 pandemic further reinforces the discussions in Chap. 3 regarding the impact of COVID-19 on the attainment of SDG 3 and paves the way forward put forth in Chap. 5 regarding new paradigm shifts in the healthcare business. For the sections on the governance pillar, the critical items having a significant impact on the ESG performance and development of ESG management structure in the healthcare industry are discussed. Examples include stakeholder engagement, board involvement, anti-corruption, tax management, and risk and crisis management, which has growing significance in the healthcare industry, particularly in the post-pandemic period. In addition, induction of top-line growth, reduction of costs, optimisation of investments and assets, risk reduction from regulatory and legal interventions, are important in ESG value creation and sustainability in the healthcare industry.

Chapter 5 comprehensively discusses the new paradigm shifts in healthcare. The discussions include exploring the impacts on the pharmaceutical industry caused by the COVID-19 pandemic, with a holistic view of a sustainable healthcare system on the advocacy of healthcare research focus on psychological wellness, health promotion and disease prevention. The influences on the healthcare industry by the community health movements are further discussed with elaborations on the SDG 3 aiming at the promotion of good health and wellness. New integrated approaches of healthcare benefiting from conventional medicine and alternative and complementary medicine are also suggested. Meanwhile, paradigm shifts in healthcare with reference to health insurance, technological advance, and applications of artificial intelligence are discussed. Based on the ESG and CSR frameworks, innovations of models for healthcare practices are important to achieve SDGs. A new Community Health Model with the

elements of 5As (availability, acceptability, accessibility, affordability, and achievability) and 5Cs (comprehensiveness, continuity, coordination, client-orientation, and cross-discipline) is introduced under the framework of sustainable healthcare. Furthermore, insights on healthcare management and hospital development are delivered by illustrating case sharing with reference to a brand-new private hospital opened in 1994. The remarkable experience from the new paradigms in the establishment, management, and operations of a new hospital serves as a valuable contribution to the organisational mission towards a sustainable healthcare system.

Chapter 6 reinforces the concepts of ESG discussed in Chap. 2 and gives extensive coverage on the promotion of ESG to various stakeholders, accounting for the achievement of sustainability in the long term. The implementation of sustainability practices and the roles of healthcare practitioners in ESG practices are discussed in relation to SDG 3 in particular, and other SDGs as well. Healthcare practitioners are highly important for attaining SDG 3 during and after the COVID-19 pandemic by providing accessible and equitable healthcare education with their expertise and experience. In addition, the improvement of ESG performance is described with reference from ESG ratings, certifications, and external sustainability assurance, while the roles of accounting and finance professionals are elaborated with sustainability practices in accounting, ESG financial products, and FinTech applications. Furthermore, contributions from the community towards long-term sustainability are discussed based on examples of higher education institutions, small- and medium-sized enterprises (SMEs), and non-governmental organisations (NGOs).

In Chap. 7, recent trends of research and education in ESG and sustainability are identified, and further insights contributing to sustainable development are discussed. The relationships between ESG, environmental sustainability, and ethical behaviours in organisations are described with selected examples. Reinforcing the importance of a sustainable environment due to the impacts of surging levels

of environmental pollution as discussed in Chap. 3 and indicated in SDG 3 target 3.9, the emerging research studies regarding green supply chain management (GSCM) have been discussed. The review of these studies links up the importance of GSCM in mitigating environmental challenges and threats while the business performance and efficiency could still be maintained or even improved. Relevant studies addressing GSCM optimisation models, implementation of GSCM practices, and GSCM performance assessment indicators are reviewed in association with SDG 3, which mainly focuses on examples of applications of GSCM in the pharmaceutical industry, steel industry, and chemistry industry, with relevance to green innovations for sustainable health. Moreover, research investigations in CSR and ESG scores are reviewed while the applications of digital technologies are discussed with an emphasis on the concepts of responsible digitalisation. The concepts of green chemistry principles are described in relation to sustainable development. Finally, the integration of sustainability concepts in business education is elaborated. Embracing sustainability concepts and values is vital in both classroom and practical learning. Discussions on the integration of sustainability concepts and ethical principles in business studies further reinforce the linkage with Chap. 5 on the new paradigm shifts in healthcare, which require the

necessary knowledge, mindset, and skills for a systems and interdisciplinary approach to achieve SDG 3. Suggestions for future work to develop a more interactive learning environment for sustainable education are described, which are supplemented with applications of digital technologies in education for sustainable development during the new era after the COVID-19 pandemic.

Inevitably, there are interconnections and interdependence among different SDGs. It is noteworthy that SDG 3 focuses on important issues regarding the promotion of good health and wellness for all; it is an important component in the overall achievement of long-term sustainable development. This book has a particular focus on SDG 3 and has discussed important issues related to the evolvement of ESG and its applications in the sustainable development of the healthcare business. SDG 3 in healthcare and business is discussed with a review of recent studies, which links with the insights on the new paradigm shifts in the healthcare business. A Community Health Model with the elements of 5As and 5Cs put forward under the framework of sustainable healthcare for the promotion of good health and well-being is complementary and necessary to the future development in the research and education of ESG and sustainable development in healthcare.