Chapter 6
Business Strategy for Sustainable Development in the Digital Era: Green Management

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Abstract Technological developments in the historical process brought along transformations that have resulted in revolutions in industry. Starting with the First Industrial Revolution that took place in the second half of the eighteenth century, we have experienced revolutionary transformations, the driving forces of which were steam power (mechanisation), electricity (mass production), electronics and information technology (automation), and cyber-physical systems (digitalisation). Besides providing many opportunities and benefits for humanity, these transformations have brought many threats regarding social, economic, technological, and environmental aspects. The awareness of these threats encouraged the development of the awareness of the need to protect the environment in its broadest sense with a collective consciousness. The understanding of sustainable development has developed as a result of this collective consciousness and stands for not damaging the potentials of future generations to meet their own needs while meeting the needs of the present generations. In this regard, green management, which is all about implementing healthy, human, and environmentally friendly practices in business functions, has gained particular importance in digital era. Therefore, the future of green management appears promising for the sake of sustainable development. In this process, taking advantage of the opportunities offered by digital technologies will make it easier to achieve these benefits. Based on this framework, in this study, green management is examined as a business strategy for sustainable development in the digital era.

Keywords Green management · Sustainable development · Business strategy · Global climate change · Digital transformation · Environmentally friendly technologies

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6.1   Introduction

Since the industry has undergone transformations that have resulted in revolutions over the years, many forms of production have come to an end, some have just emerged, and some will emerge soon. In this ongoing series of revolution, technological developments have played a significant role both in industrial transformation and social development in each period (TWI2050 2019). In fact, the developments are expected to support human well-being in the long-term. However, in addition to providing opportunities and benefits for humanity, all developments brought unintended social, economic, technological, and environmental consequences as well (Scholz 2017).

One of the foremost—perhaps the foremost—vital and harmful consequence of industrialization that has been on the agenda recently is undoubtedly global climate change (Houghton 2009). Beginning with the second half of the eighteenth century, when the Industrial Revolution took place and people started to consume fossil fuels, human impact on the environment has reached global dimensions. Since then, besides the natural cycles, the human factor is also considered to have had a contribution to the changes in the composition of the atmosphere, which are likely to lead to climate change. Therefore, the earth has experienced increases in temperature, which have caused global warming due to the rapid increase in greenhouse gases, which are mainly caused by burning huge amounts of fossil fuels. Moreover, the greenhouse gas levels in the atmosphere, which have increased with the use of these fossil fuels since the Industrial Revolution, have resulted in changes in both global and regional climate patterns (Weart 2008).

Global climate change is widely considered to be a serious threat to places, species, and people's livelihoods. Therefore, awareness of the threats has encouraged the development of a collective consciousness of the need to protect the environment by considering it in a much more comprehensive dimension (Paula and Cavalcanti 2000). The understanding of sustainable development, which is being continued as one of the main discussion topics of the twenty-first century, is the result of this collective consciousness. Such an understanding stands for not damaging the potentials of future generations to meet their own needs while meeting the needs of the present generations. Indeed, issues such as the acceleration of industrialisation, the rapid growth of the population, common nutritional deficiencies, the depletion of non-renewable resources, and the deterioration of ecological balance are among the main areas of interest for sustainable development (Choi 2017).

In this context, today businesses have adopted or tend to adopt sustainable practices in all or part of their business functions. For instance, some organisations convert waste heat or water back into energy in their production processes; some others use 100% recyclable materials in their products; and some use environmentally friendly low-emission vehicles in their logistics (Russell et al. 2007). At this point, as the natural result of businesses' sustainable development strategies, the understanding of green management has gained importance. Green management

may be perceived as a business strategy aimed at changing entire business practices and operational processes to reduce the adverse impacts on the environment, to be healthy, human, and environmentally friendly (Simula et al. 2009).

On the other side, currently we are in the middle of a digital transformation that will fundamentally change our relationship with the environment and our work and lifestyle. As mentioned above, the same can be considered for the revolution caused by digital transformation, as all previous revolutions bring along big winners and losers (TWI2050 2019). In general, the digital transformation will have positive contributions, yet there will also be clear dangers and downsides. A thorough understanding and application of digitalisation is an important strategy phase for forward-looking businesses because of the great potential for advances in technology and digitalisation to drive society towards a sustainable future. Since it plays a vital role in balancing the natural environment and social development, the future of green management appears promising for each organisation in this era (Colglazier 2018).

Based on this framework, this study examines green management as a business strategy for sustainable development in the digital era. It is thought that this study, which is based on an international literature search, will provide a useful viewpoint for businesses. Applying and managing green management practices effectively may help businesses increase their efficiency and gain competitive advantage. Also, taking advantage of the opportunities offered by digital technologies in this process will accelerate these benefits.

The study was structured in three sections. In the next section, industrial revolutions were briefly overviewed within the historical process. Following this overview, digital transformation as a characteristic feature of today's industry was discussed in detail. In the third section, within the framework of the concept of sustainable development, a series of international conferences and initiatives that contributed to this concept was explained. This section further presented economic development, social development, and environmental protection as three components of sustainable development. In the fourth section, by focusing on the term *green*, the concept of green management was explained. Following this, the need for and the scope of green management were illustrated. Finally, in the conclusion, by referring to the discussed literature in these three sections, the relationship between digital transformation and sustainable development was handled, and the role of green management as a business strategy was revealed.

6.2   The Digital Era

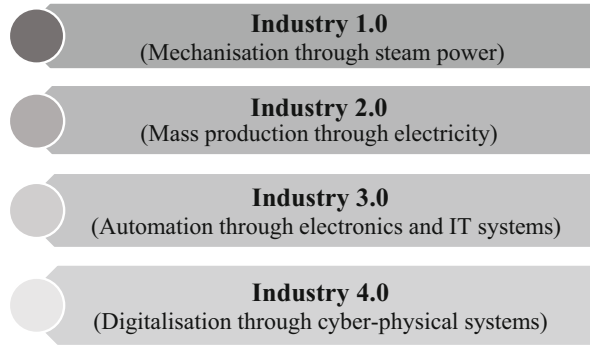### 6.2.1   Overview of the Industrial Revolutions

Industry, an important determinant of production and an essential source of income for the economy in general, has undergone transformations that have resulted in revolutions over the years. Production patterns have changed, and production

channels have diversified through these transformations. Before the industrial revolutions, which will further be discussed in detail below, everything was produced by the muscle power of either a human being or an animal. However, with these transformations, many forms of production have ended, some have just emerged, and some will emerge soon.

Although it is obvious that transformations will continue rapidly in the future, these transformations in the industry can be evaluated in four periods. The first significant period is the First Industrial Revolution (Industry 1.0), which took place in the second half of the 1700s, with the invention of coal-based steam machines and their subsequent use as an energy source in production lines. Industry 1.0 is considered the starting period for technological developments and the series of industrial revolutions that have been achieved ever since. In Industry 1.0, human and animal muscle power, as the main energy sources in previous periods, were replaced by a new energy source—machines operating with steam power (Herzberg et al. 1959). During this period, which was characterised by the transition from labour-intense production to machine-intense production, productivity and efficiency started to increase (Choi 2017). Industry 1.0 has paved the way for the Second Industrial Revolution (Industry 2.0). While the driving force was steam machines in Industry 1.0, in Industry 2.0, it was electrical power, which led to the increase in mass production capacity, the diversification of the products produced, and a decrease in costs. In practical terms, major differences between Industry 1.0 and 2.0 were the increased production capacities that sprang from the new machines used in production. Industry 2.0 was started in the second half of the 1800s and continued until the second half of the 1900s. Next, with the Third Industrial Revolution (Industry 3.0), the driving force became automation through electronics and information technologies (IT). Especially after the 1940s, ground-breaking innovations were seen in electronics and IT. After electronics and IT became the driving forces in production, much smaller and practical products entered our daily lives. In this process, the fact that the machines dominated not only working life but also our daily life caused the need for manpower to decrease (Schwab and Davis 2018). Finally, the Fourth Industrial Revolution (Industry 4.0), which started with the end of Industry 3.0 around 2010, is the name given to a total digital transformation through cyber-physical systems, covering many areas such as smart robots, fully autonomous systems, and virtual reality (Schwab 2017). Figure 6.1 below summarises this historical process:

When all these industrial revolutions, from Industry 1.0 to Industry 4.0, are taken into consideration, it is obvious that technology has played a very significant role in transforming from one period to another. Thus, there have been revolutionary transformations in production from steam-powered machines to electricity-powered machines and from automatic machines to digital machines and virtual environments that can communicate with each other. In this historical process, each period has a unique characteristic feature depending on the developments in technology, and each period removes the practical validity of the previous one on a large scale (TWI2050 2019).

Fig. 6.1 The historical
process from Industry 1.0 to
Industry 4.0

Industry 1.0
(Mechanisation through steam power)

Industry 2.0
(Mass production through electricity)

Industry 3.0
(Automation through electronics and IT systems)

Industry 4.0
(Digitalisation through cyber-physical systems)

Technological development, which has rapidly accelerated during the twenty-first century, continues to bring rapid change and transformation in all areas, especially with the widespread and effective use of developments in information and communication technologies (İlhan 2019). This current period, which is also known as the Digital Era,[1] is regarded as the period in which the most important socioeconomic and cultural developments have been experienced since Industry 1.0 (Nambisan and Baron 2013; Zaheer et al. 2019). In this period, information and communication technologies are developing complementary to each other and providing information flow more effectively, which catalyses this acceleration. Of course, the previous revolutions have created great social changes and opportunities, but the transformations we have experienced in this century are far more advanced than the previous ones in terms of the speed at which new ideas and technologies spread around the world (Schwab 2017). This has resulted in the effects of change and transformation covering all areas of life, from the economy to education and from working conditions to organisational culture (Nambisan et al. 2017; Yoo 2010).

In this industrial revolution process, although digital transformation, which will be discussed further in the following section, has reached its popularity very recently, its journey started in the middle of the twentieth century. It was just about the time when semiconductors, mainframe computing (in the 1960s), personal computing (in the1970s), and the internet (in the 1990s) became major digital drivers, respectively (Cortada 2012). From this perspective, digitalisation is not a new phenomenon. However, with the rise of smart, mobile, and artificial technologies, digital technologies have experienced a significant increase. In this sense, they have become an important part of the strategy of many businesses by moving from support processes to core processes (Yoo et al. 2012).

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[1]Also known as the Computer Age, Digital Age, Information Age or New Media Age.

6.2.2 Digital Transformation

Digital transformation, which characterises Industry 4.0, is described and defined from different perspectives in the literature. To give certain examples, first of all, researchers describe digital transformation as a process (Agarwal et al. 2010; Loebbecke and Picot 2015), a strategy (Granados and Gupta 2015; Hansen and Sia 2015), or a business model (Stieglitz and Brockmann 2012). In addition, digital transformation is rather defined by emphasising its features, drivers, and impacts. For example, the features of digital transformation are defined as evolutionary (Westerman et al. 2014), radical (Berman and Marshall 2014; Granados and Gupta 2015), or disruptive (Janowski 2015; Loebbecke and Picot 2015). Moreover, the drivers of digital transformation are defined as digital technologies (Berman 2012; Setia et al. 2013), strategies (Bharadwaj et al. 2013; Matt et al. 2015), or a value chain (Tamm et al. 2015). Finally, the impacts of digital transformation are defined as value creation (Berman and Marshall 2014; Chen et al. 2014), competitive advantage (Matt et al. 2015; Schuchmann and Seufert 2015), or improved relationships (Bharosa et al. 2013).

Based on these definitions, in this study, digital transformation is defined as follows: An evolutionary process that uses digital technologies to create additional value for the business itself and the stakeholders, ultimately resulting in improved profitability. This definition can be broken down into four primary focuses: (a) Being an evolutionary process, (b) using digital technologies, (c) aiming to create additional value for the business itself and the stakeholders, and (d) improving profitability.

To further explain and clarify this definition, first of all, the feature of digital transformation is defined as an evolutionary process, since being an evolutionary process indicates that digital transformation continues for a certain period by integrating digital technologies into all functions of the business (Bharosa et al. 2013; Liu et al. 2011; Schuchmann and Seufert 2015). Next, the driver of digital transformation is defined as digital technologies because it is believed that digital technologies, which allow for digitisation and facilitates digitalisation, play a vital role in the digital transformation process by coupling other factors including business strategy, organisational culture, and a digitally-savvy workforce. As is highlighted by the literature, the best digital transformation results may be obtained when digital capabilities are combined with digital technologies (Berman and Marshall 2014; Loebbecke and Picot 2015; Matt et al. 2015). In other words, at the foundation of all technology-enabled organisational transformation efforts, there are technology-based systems (Besson and Rowe 2012). Furthermore, the impact of digital transformation is defined as creating additional value for the business itself and the stakeholders (Berman and Marshall 2014; Bharosa et al. 2013). Lastly, the result of digital transformation is defined as improved profitability. As for businesses, they cannot sustain their activities in the long-term without maximising their profit (Besler 2009).

Today, digital developments, such as connectivity, artificial intelligence, machine learning, robotics, and 3-D printing have been continuing to gain prevalence (Lee et al. 2015; Roblek et al. 2016). By favouring non-material and shared benefits, these developments are expected to play a key role in long-term social transformations and supporting human well-being. However, starting from Industry 1.0, all revolutions have resulted on one side in great winners and on the other side in losers as well. The digital transformation is also considered a double-edged sword with its winners and losers. In this sense, it reshapes the entire society, particularly by affecting the economy, workforce, energy resources, and carbon efficiency. It also reduces production costs and increases access to services (TWI2050 2019). But, in addition to providing such opportunities and benefits, it adds complexity, threats, and vulnerabilities to the different areas of society and the economy as well (Scholz 2017). In fact, generally, the main feature of industrialisation in a negative sense is that it causes an increase in technological, social, and environmental risks and crises. These risks and crises have arisen depending on the industrial activities of the businesses (Shrivastava 1995). They were initially excused for development, over time they ceased to be just local—they gradually became regional and then global. Therefore, the awareness of these threats has encouraged the development of a collective consciousness of the need to protect the environment by considering it in a much more comprehensive dimension and has created an environment for the birth of sustainable development (Paula and Cavalcanti 2000).

6.3 Sustainable Development

6.3.1 Concept of Sustainable Development

Sustainable development is one of the main discussion topics of the twenty-first century. Although the scope of it and the responsibilities of the parties continue to be discussed, the definitions are basically diversified within the framework of the following definition provided in the report published by the United Nations (UN)[2] World Commission on Environment and Development (WCED 1987: 16): '*Sustainable development is a development which meets the needs of the present without compromising the ability of future generations to meet their own needs*'. The definition consists of two key concepts: (a) Needs are not limited to economic needs only but to a wider scope and imply the essential needs of the poorest, to which priority should be given (b) by meeting present and future needs, equity among generations is targeted. Therefore, the idea of transferring ecological capital stock to future generations comes to the fore within the scope of this definition (Choi

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[2]Founded in 1945, the United Nations (UN) currently comprises 193 countries. It aims to enable governments to solve problems arising from these challenges together by allowing member countries to express their views on the challenges facing the world.

2017). In other words, the concept of sustainable development expresses an ethical concern about the need to provide and maintain an appropriate ecological infrastructure both for present and future generations (Wiersum 1995).

Increasing awareness of environmental problems on a global scale mentioned in the previous section has stimulated policymakers to promote a series of international conferences and initiatives to discuss the potential ways forward. To begin with, in 1972, the UN Conference on the Human Environment (UNCHE),[3] held in Stockholm, focused on the need to develop a common perspective and common principles that will inspire and guide the world for environmental protection. This conference was important in terms of accepting the existence of environmental problems at a global level and revealing the necessity of seeking solutions. As a matter of fact, it is possible to say that great steps have been taken to combat environmental problems worldwide since then. Such that, following it, in 1983, the UN Environment Programme (UNEP) was established to find a solution to the environmental and economic problems that came to the fore in Stockholm. The commission carried out various studies worldwide and presented its final report to the UN General Assembly. In 1987, WCED published this report, 'Our Common Future', later referred to as the Brundtland Report. As mentioned above, the report has provided a definition that remains widely used for sustainable development even today. The Brundtland Report paved the way for developing a global action plan for sustainable development, addressing economic, social, and environmental issues. In 1992, the UN Conference on Environment and Development, also known as the Rio Earth Summit, was held. It was one of the largest environmental conferences ever held, and it brought together more than 100 heads of state. The World Summit on Sustainable Development (WSSD), held in Johannesburg, South Africa[4] in 2002, was another important step taken in this sense. The summit brought together leaders of civil society organisations, businesses, and other groups, especially heads of state and government. The main focus of the summit was again to direct actions to overcome the difficult challenges facing the world. More recently, along with the 2015 Paris Agreement, which has made all signatories a long-term goal to keep the global average temperature rise below 2 °C and below 1.5 °C if possible, in 2015, the UN adopted the 2030 Agenda for Sustainable Development, which is planned to be achieved by 2030. The 2030 Agenda includes 169 targets within 17 sustainable development goals to realise the desired future for human development.

Although not limited to the ones mentioned above, there are some other important international conferences and initiatives on sustainable development. The point reached with these is basically within the framework of the acceleration of industrialisation, rapid growth of the population, common nutritional deficiencies, depletion of non-renewable resources, and deterioration of ecological balance (TWI2050 2019). Such international conferences and initiatives on sustainable

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[3]Also known as the Stockholm Conference.

[4]Also known as 'Rio+10' since it was convened 10 years after the first Earth Summit in Rio de Janeiro.

development have also led to the development of global standards and principles for businesses that want to operate within the framework of sustainability (Tokgöz and Önce 2009).

Returning to the emergence of a need for sustainable development, it was, as discussed before, the undesirable consequences of industrial revolutions and social developments. These undesirable consequences, which have come to the forefront as a threatening world problem, have become increasingly important and paved the way for sustainable development to be accepted as a common political goal by all countries (Shrivastava 1995). It is also because achieving more holistic successes as well as economic successes have become important in ensuring corporate sustainability and stakeholders have come to expect businesses to create social value. In this context, it has been an important requirement for businesses to carry out activities demonstrating that they care about all their stakeholders (Nunes and Bennett 2010).

In fact, the relationship between population growth, resource consumption, and environmental impacts and sustainability have been discussed since the 1950s. At first, according to the traditional management approach, it was not accepted as being among the responsibilities of businesses. Rather, the main responsibility of businesses was towards their shareholders just by focusing on profit and growth. Thus, many issues within the scope of sustainability were regarded and deemed as the responsibility of governments (Russell et al. 2007). Moreover, classical economists excluded environmental problems for a long time as they assumed that natural resources have unlimited availability. Over time, this understanding has gradually changed, and it has become a requirement for businesses to include not only their shareholders but also other parties that they influence during their operations (Young and Thylil 2008). Indeed, today, proponents of sustainability argue that it is unacceptable for businesses to continue their activities by ignoring this requirement (Marshall and Brown 2003).

6.3.2 Components of Sustainable Development

With the 2005 World Summit held in New York, more than 170 heads of state and government have come together. The summit identified components of sustainable development as economic development, social development, and environmental protection. It was also admitted at the summit that these components are interdependent and mutually reinforcing pillars thus, to achieve sustainability, they should be in balance and equal harmony. Such an understanding emphasises the importance of each of these three components and implies that an implementation cannot be completely sustainable unless all these three components are fully met (Casula and Soneryd 2012; Morelli 2011).

One more issue that needs attention in this regard is that sustainable development has a broad range of aspects: It could be considered in the (a) global context (Liu et al. 2011), (b) local context (Wagner 2014), or (c) organisational context (Beasley and Showalter 2015). This study focuses on the organisational context of

sustainability. Based on this framework, for instance, Hart and Dowell (2011) define a sustainable development strategy within the scope of these three components by drawing attention to the importance of the sustainability of eco-friendly production processes in the future. In another study, Torugsa et al. (2013) define a sustainability strategy in which economic development, social development, and environmental protection are integrated into a single strategy. Therefore, a sustainable business strategy may be represented as integrating the strategies regarding economic development, social development, and environmental protection into the organisation's goals, activities, and plans, to create long-term value not only for the business itself but also for its stakeholders. While preserving the natural resources that will be needed in the future and developing them by ensuring their sustainability, today sustainable development adopts strategies and activities to meet the needs of the businesses and stakeholders (Mustapha et al. 2017). Moreover, such a strategy recognises that the components of sustainability are not exclusive but rather reinforcing (Long 2019). Thus, we need to fully understand the dynamics of these components, which are further discussed below, to determine the integration between them.

6.3.2.1 Economic Development

Economic development means that the economic production of an economy can be supported at a defined level indefinitely (Costache et al. 2019). The potential for resource depletion has an important role in the economic dimension of sustainability. Due to this potential, sustainability has always been a core aspect of the economy regarding renewable natural resources (Vivien 2008). Therefore, resources must be used efficiently and responsibly to continue operating sustainably and consistently generate operational profit in the future.

As for businesses, they cannot sustain their activities in the long-term without gaining profit, and thus, the main purpose of businesses as an economic asset is to maximise their profits. Therefore, economic development is about evaluating opportunities that arise with economic, social, and environmental activities. In this regard, it can be considered as an approach that aims to be profitable while continuing activities that benefit society, such as creating value for stakeholders in the long-term (Besler 2009). In other words, it is to ensure that the current assets of a business continue to regularly operate effectively and efficiently over time (Moldan et al. 2012). Applications such as recycling energy and materials into raw materials, using less material in the provision of goods and services, and recycling of waste generated by production processes, consumers, or producers may be considered in this context (Vivien 2008).

6.3.2.2 Social Development

Social development emphasises meeting the basic needs of individuals in society. It covers issues such as social justice, social equity, health equity, community development, human rights, labour rights, social support, community resilience, and cultural competence. By covering these issues, social development includes the maintenance of physical, cultural, and social spaces that support social well-being and the provision of opportunities for people to benefit from them (Palich and Edmonds 2013). Moreover, it aims to ensure that future generations will have access to such social resources, at least, as much as the present generations. At this point, it is a positive understanding that supports strong social cohesion and equity in access to basic social services (Mak and Peacock 2011).

A sustainable work organisation would consider protecting the functional capabilities of its employees, stakeholders, and affected natural resources while trying to achieve its economic goals (Kira and Eijnatten 2008). Therefore, it can be inferred that socially sustainable businesses provide a good quality of working life for the employees and the stakeholders. In this context, businesses are expected to place value on human capital by considering the interests of the employees and the stakeholders while striving to be equitable and ethical. Further, businesses are expected to strive for long-term social sustainability regarding the ability to meet the basic needs of future generations (Mustapha et al. 2017).

6.3.2.3 Environmental Protection

Environmental protection is the ability to meet today's demands by not reducing natural capacity to ensure that everyone lives well in the future. In other words, it is a state that implies caring for meeting the needs of the future generations while meeting the needs of the present generations. In this regard, environmental protection may be defined as an effort to maintain ecological balance by adopting behaviours that can keep the environment in its most natural state (Morelli 2011). As a whole, it addresses the relationship of human beings with nature, considering that sustainability of environmental factors, which are vital for all living things, is essential for the continuation of life in the future (Goodland and Daly 1996).

Considering the above, businesses are expected to make responsible choices that will reduce any harmful influences of their facilities on the environment. However, such expectations are not only related to limited practices such as reducing the amount of waste or using less energy. They are also about developing processes that will make businesses fully sustainable in the future (Costache et al. 2019). That is, the main issue emphasised by environmental protection is the impact of whole business facilities on the environment. Therefore, environmental protection paves the way for businesses to review their environmental impacts, drawing attention to global environmental concerns. It also provides the opportunity to integrate

sustainability goals into business strategies, such as corporate social responsibility programs, with a broader perspective (Mustapha et al. 2017).

There are environmental management systems that include a range of processes and practices to enable businesses to reduce their environmental impact and increase their efficiency. They guide businesses to develop environmental policies, set goals and processes to achieve these policies, and adhere to the requirements of international standards by constantly improving their performance (García-Pozo et al. 2013). In this sense, businesses are expected to identify and manage any sources of environmental problems related to their operational activities taking the environmental management systems as a guide (Lemaire et al. 2014).

6.4 Green Management

6.4.1 Concept of Green Management

It is important to fully understand what the term *green* means before defining green management. In general, the use of the term indicates that something is healthy, human, and environmentally friendly (Alzgool 2019). Today, the term *green* in the operational sense has become frequently used in the context of referring to new technologies and new products that have a sustainable impact on nature and the environment (Simula et al. 2009). It also refers to the commitment to sustainability within business policy (Misso et al. 2018).

While sustainable development is examined within its three components as economic, social, and environmental, green management, which gained popularity in the 2000s, is handled in a way that covers all these components (Siegel 2009). In this sense, it may be defined as a business activity in the context of converting inputs such as raw materials and auxiliaries into outputs such as goods and services, focusing on the balance between economic, social, and environmental benefits (Raharjo 2019). However, it fundamentally refers to environmental practices. Thus, it is about implementing appropriate eco-friendly activities, which on the one hand improve the level of individuals' awareness for environmental protection and on the other hand minimise the businesses' negative effects on the environment (Rawashdeh 2018).

Some businesses consider simple actions, such as compliance with legal standards or reducing paper consumption, as green management practices. Beyond that, green management is a collection of green practices adopted by businesses requiring new corporate strategies, organisational restructuring, or a complete revision of production processes (Haden et al. 2009). In its broadest scope, it is the process of changing the organisational structure, individual responsibilities, directives, administrative practices, and operational processes to achieve organisational goals, especially by adding environmental variables to product and process development activities and reducing the negative effects of operational facilities (Molina-Azorin et al. 2009).

For businesses, green practices can be effective as long as individual green values are developed. Indeed, in achieving any organisational policy, individuals have always played an important role (Liu et al. 2011). Therefore, it is necessary to develop and enrich individual green values to make it easier for businesses to reach their targets in green practices (Edwards and Shipp 2007). In this context, since practices and policies in the workplace have a great influence on guiding employees' behaviour (Bissing-Olson et al. 2013), businesses can contribute to the development of individual green values with the green practices they put into practice (Shen et al. 2018).

6.4.2 Need for Green Management

As explained above, technological developments have contributed to an increase in productivity, efficiency, and profitability. However, they have brought along damages by contributing to the resource shortage and the ecological balance disruption. As a matter of fact, undeniable urgency has arisen to prevent this environmental damage (Haden et al. 2009). At this point, green management, which defends environmental awareness, has gained importance as a natural result of the sustainable development strategy of businesses (Simula et al. 2009).

Nature requires its users to have a more caring attitude so that resources could be preserved and utilised longer. The increasing utilisation of natural resources is gradually leading businesses to a serious situation that demands the urgent attention of all concerned parties. Businesses with increased environmental concerns are now required to act to avoid any harmful effects on the environment (Haden et al. 2009). This situation suggests behaving in a manner to help save natural resources (Alshuwaikhat and Abubakar 2008). Within every business, it is the responsibility of every individual, from the lowest level staff to the senior management, to perform business activities by using the minimum amount of natural resources; thus, individuals and businesses are required to act responsibly to apply green practices (Opatha and Arulrajah 2014).

Green management covers both business ethics and corporate social responsibility perspectives. From the business ethics perspective, it supports businesses in protecting the natural environment. From the corporate social responsibility perspective, it supports creating positive organisational environmental performance by satisfying stakeholders' needs and expectations. Therefore, both perspectives highlight the importance of green management practices for businesses to create and maintain environmental performance (Rawashdeh 2018). That is why green management has become a popular management strategy for businesses to achieve their goals effectively. Studies reveal that implementing green management practices successfully may help businesses improve their productivity and gain a competitive advantage (e.g., Roy and Khastagir 2016; Schniederjans et al. 2006; Yang et al. 2015). Therefore, businesses endeavour to build green practices over time to achieve productivity and increase their core competencies (Rawashdeh 2018).

Further reasons that trigger this change in an international context may be listed as follows: (a) Environmental legislation has increased exponentially and legal requirements have become widespread to include environmental concerns in product development issues (Haden et al. 2009), (b) a niche market with environmentally-friendly green consumers has emerged (Pujari 2006), (c) environmental organisations have created local awareness to act against environmentally harmful businesses (Claver et al. 2007), and (d) high environmental performance has started to be seen as an important competitive advantage for businesses (Porter and Van Der Linde 1995).

6.4.3   Scope of Green Management

Green management is a business strategy that aims to create positive business performance to support sustainable development. This strategy plays a vital role in developing more productive and competitive businesses while leading them to minimise their harmful effects on the environment (Alzgool 2019). In this context, green management practices regarding main business functions, such as green production, green marketing, green accounting and finance, green human resources, and green public relations, need to be discussed.

To detail these main business functions in terms of green management, it will be better to discuss *green production*. Green production is a business strategy that focuses on environmentally friendly business processes (Ali 2015). In other words, it is integrating preventive environmental management strategies into business processes to eliminate the risks of environmental damage (Büyüközkan and Vardaroğlu 2008). The primary factor affecting green production is using renewable energy sources. Moreover, many tools, such as environmentally friendly technologies and recycling methods, facilitate the expansion of green production (Yu et al. 2016). Another factor affecting green production is green innovation in which new ideas, attitudes, products, and processes will be developed and implemented to support sustainable development and to reduce environmental damage (Rennings 2000).

Green marketing is the next main business function in terms of green management. It includes all kinds of environmentally friendly marketing activities aimed at meeting consumer demands and needs. While meeting these demands and requirements, it draws attention to minimise damage to the natural environment. In this context, it may be defined as the realisation of the marketing process with the least harm to the natural environment (Crane 2000). Unfortunately, many people consider terms such as recyclable, refillable, phosphate-free, ozone-friendly, and environmentally friendly as the whole scope of green marketing and believe that it refers to the advertising of products with such characteristics. However, green marketing is a much broader practice in terms of developing unique strategies (Polonsky 1994).

One of the other main business functions in terms of green management is *green accounting and finance*. Changing environmental factors pose new responsibilities to accounting and finance professionals to develop innovative approaches to

incorporate environmental factors into their accounting and to develop products to finance the transition to a low-carbon and environmentally friendly economy (Şenocak and Bursalı 2018). The classification of the environmental activities of businesses and the arrangement of their ultimate dimensions in the balance sheet of the business are the focus of green accounting and finance. Therefore, green accounting and finance deal with creating new financial information and control systems to obtain more environmental benefits. In this sense, green accounting and finance involve the efficient allocation of resources for sustainable development. Besides, monitoring the sustainability performance of these resources is important for the protection of the environment (Ng 2018). Furthermore, as a result of technological advances, the economic transformation has rapidly taken place especially over the last 30 years (Ertuğrul 2020). Intangibles-based assets have dominated today's economy, which makes them the locomotive of economic wealth and growth (Lev 2000). This rapid transformation has triggered certain discussions on the recording and reporting of intangibles (Ertuğrul 2020). Those discussions should also include green aspects of the issue. This rapid transformation based on intangibles should also incorporate green accounting and finance practices not being limited to green investments or low-carbon orientation as in the tangible-based old economic system. In other words, concerns highlighted by Şenocak and Bursalı (2018) are also valid for the current economic system, which should develop green accounting and finance practices to improve the sustainability and competitiveness of the system.

Another business function in terms of green management is *green human resources management.* Green HRM involves the systematic and planned harmonisation of traditional human resources management practices with the sustainability goals of the organisation within the framework of the environmental protection component (Jabbour and Santos 2008). In this sense, green practices within the framework of the HRM function constitute systematic practices adopted to support the environmental sustainability performance of the organisation (Saeed et al. 2019). This approach means that all HRM practices, especially recruitment, training and development, performance management and evaluation, rewards and compensation, are aligned with the sustainability objectives with the focus on an environmental protection component (Haddock-Millar et al. 2016). Thus, employees will be able to adopt and implement policies and develop behaviours and learning processes to improve environmental activities such as reducing their carbon footprint, using natural resources rationally, and recycling. In this regard, green human resources play a central role in raising environmental awareness among employees and other stakeholders (Khurshid and Darzi 2016).

Finally, *green public relations* is one more business function in terms of green management. It provides advantages to businesses in managing company (or brand) image and developing relations with stakeholders (Khurshid and Darzi 2016). As known, a damaged company (or brand) image negatively affects both customer loyalty and employee commitment. It also threatens the financial well-being and sustainability purpose of the businesses (Argenti and Druckenmiller 2004). In this regard, it involves communicating about an organisation's corporate social responsibility or environmentally friendly facilities to the public. Such facilities, which will

be carried out in a realistic attitude, will contribute to the development of environmental awareness of stakeholders. On the other hand, these facilities will also contribute to the reputation of the company (Ahmad 2015).

6.5   Conclusion

In the twenty-first century, the world is witnessing the Fourth Industrial Revolution and the digital transformation, which is commonly known as Industry 4.0. Since the first Industrial Revolution in the eighteenth century, the world has been dealing with the challenges of producing more goods from limited natural resources to meet ever-growing consumption demands (Beier et al. 2018). In this ongoing process, technological developments have resulted in both negative and positive consequences. Technological developments have also been the tool to combat the negative consequences they have brought (Müller et al. 2018).

On the one hand, social development should continue and on the other hand, our responsibility to leave a livable world to the next generations has resulted in the search for a balance between social development and environmental protection (Bebbington and Larrinaga 2014). Sustainable development, as an approach, has emerged as a result of such need, and the concept was first proposed through the Brundtland Report by the WCED in 1987, which described sustainable development by focusing on not damaging the potentials of future generations to meet their own needs while meeting the needs of the present generations.

The 2005 World Summit identified three components of sustainable development. In this sense, first, economic development concerns long-term economic growth and suggests that the growth of economic capital should not be at the expense of a decrease in natural or social capital. Thus, economic growth should not ignore the balance in natural resources, ecosystems, social welfare, and distribution of wealth (Choi and Ng 2011). Next, social development is the process of recognising and managing the positive and negative business, environmental, economic, and technological impacts on people. Its ultimate goal is the creation of healthy and livable communities where everyone is protected from discrimination and has access to universal human rights and basic amenities such as security or healthcare (Dempsey et al. 2011). Third, environmental protection is mainly concerned with maintaining the equilibrium of the environmental system, the balance of natural resources consumption and replenishment, and ecological integrity (Glavic and Lukman 2007).

Recently, considering that the level of energy and material consumption has increased, which contributes to environmental damage and natural resource exhaustion, maintaining both environmental and social development by limiting negative impacts has become more vital (Ghobakhloo 2020). Therefore, awareness among businesses towards green management has gained importance. Green management, in general, refers to implementing environmentally friendly practices in business functions. The core value of green management is the priority of protecting the

environment in all its initiatives (Rawashdeh 2018). In this sense, it is a comprehensive phenomenon that has developed particular importance in this era. Green management is all about sustainable development for businesses without compromising the future needs since green practices aim to reduce pollution and try to prevent carbon emissions from causing the greenhouse effect (Scholz and Voracek 2016).

At this point, it is believed that the digital transformation will re-interpret the understanding of sustainable development by radically changing all dimensions of societies and economies. In this respect, it is claimed that digitalisation will be the driving force of a change that can break the barriers in front of sustainable development as well. Putting aside the potential threats of digitalisation, developing scientific, technological, and innovative road maps to better understand its benefits should be a priority for businesses (Colglazier 2018) For digital transformation to play a positive role in supporting sustainable development goals, the three components of sustainable development need to be implemented within the prerequisites and objectives of economic development, social development, and environmental protection. On the other hand, ignoring them may cause the financial structures and market shares of businesses to weaken over time.

Many studies show that businesses that gain comprehensive information about the contribution of digital technologies to the sustainability of their businesses and use this information to reshape their business strategies will be successful in the digital era (Steurer et al. 2005; Torugsa et al. 2013). Therefore, sustainable development in the digital era must be achieved by taking into consideration the dynamics of the digital transformation and the goals of the international meetings and the initiatives—more recently, the 2030 Agenda and the Paris Agreement—on sustainable development. Hopefully, the future of green management seems promising for organisations in this era as it plays a vital role in balancing environmental protection and social development (Colglazier 2018). In this process, making effective use of green management practices by benefiting from the opportunities offered by digital technologies will help businesses not only balance environmental protection and social development but also increase their efficiency and gain a competitive advantage.

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