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Forecasting sustainable fashion futures: Backcasting and scenario planning strategies

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Abstract

In recent decades, emerging fashion business models and technologies have unlocked quick and effective ways to respond to consumer trends. Fashion businesses can produce fashion products at an increasingly rapid rate, in large volumes, using an optimised production system. Despite this, fashion businesses and forecasters often struggle to define long-term strategic directions that would competently address environmental and social issues in the industry and meet sustainable development goals (SDGs). Scenario building and backcasting have emerged as viable alternative forecasting methods for envisioning desired outcomes and defining procedures to achieve those outcomes. However, there is limited research on how fashion forecasters can effectively use these methods to develop long-term business strategies. This chapter offers recommendations for devising consumer lifestyle scenarios and guidance for developing retail strategies that address both global challenges and consumer needs. It includes case studies of scenario-building and backcasting methods used by industry practitioners to address SDGs. The chapter also explores the near future of the consumer retail experience with five plausible retailing scenarios for 2040.

Learning Objectives

- Apprehend long- and short-term forecasting within the fashion industry system.
- Critically examine reasons why incorporating sustainability into forecasts is necessary.
- Discover how to capture a wide range of weak signals that identify emerging macro-trends shaping consumer society and how to formulate business practices responsive to those trends.
- Appreciate the difference between forecasting and backcasting approaches.
- Examine scenario-planning principles, characteristics and techniques to anticipate diverse types of futures for fashion businesses and consumer lifestyles.

Introduction

It is widely acknowledged that the fashion industry has a substantial positive impact on the global economy. The international fashion market is worth an estimated US$2.5 trillion and employs more than 75 million workers globally (The United Nations Economic Commission for Europe (UNECE 2024). In 2021 alone, the United Kingdom's fashion and textile industry contributed £62 billion to the country's GDP, employed 1.3 million workers and generated more than £23 billion in revenue from taxes, according to a recent comprehensive study conducted by UK Fashion and Textile Association (UKFT 2023). Fashion is also considered

to be one of the most symbolically important creative commercial outputs, given its influence on consumer lifestyles and its knock-on effect on innovation in other creative sectors.

Despite the many positive effects of the fashion industry on society and economy, fashion businesses face significant criticisms arising from the environmental, social and ethical problems generated by the overproduction and overconsumption of fashion. Environmental and societal issues are prevalent across the fashion value chain and are encountered at many stages, be that at the material production and processing stage (including fibre processing, textiles manufacturing, dyeing and finishing), during garment manufacturing, transportation, or at the consumer use, reuse or disposal stage (Allwood et al. 2006; Hur and Cassidy 2019). As such, fashion businesses are encountering increasing demands from public, government and non-profit organisations (NGOs) to tackle the negative consequences of their operations. Corporate social responsibility (CSR) and environmental, social and governance (ESG) activities are playing increasingly important roles in contemporary fashion business practices and will continue to do so in the future.

Traditionally, the role of fashion trend forecasting has predominantly focused on micro-trends, such as reporting on seasonal aesthetic trends that contain colour, textile and style directions to help fashion designers and buyers develop future products. However, many businesses need forecasts of shifts in macro-trends to help them develop a long-term strategy to ensure the future sustainability of the business and meet ESG standards. Fashion companies are often under significant pressure to adopt sustainability practices and call for forecasters to incorporate sustainability into their predictions. Although some fashion trend agencies offer suggestions for better integrating sustainability into strategic business directions, and developing new products using alternative sustainable materials and green production, sustainability issues in the fashion industry are worthy of more consideration. However, discerning relevant future-facing sustainable business strategies in the face of complexity can be difficult for forecasters, who are equipped with little to guide them as they address issues of sustainability in long-term business directions, particularly when macro-trends and multiple stakeholders' activities – not all of them motivated by a desire for sustainability – complicate the landscape.

Currently, traditional fashion business models are experiencing numerous disruptions in their methods of producing, retailing and promoting fashion garments. Thirty years ago, Clark and Wheelwright (1993) anticipated the significant factors that would drive change and be important to address in future business practices. These included intense global competition, fragmented markets and diverse and rapidly evolving technology. Although made three decades ago, this forecast proved prescient, and these factors continue to significantly influence business activities today. As a result, consumers expect exceptional levels of product and service performance, and the rapid advancement of innovative technology and scientific knowledge has expanded the range of potential solutions for developing new items beyond what we could have imagined. The speed of change is expected to surge in the future due to the ongoing popularity of e-commerce, the metaverse, and emerging artificial intelligence (AI) and extended reality technologies. This digital e-commerce revolution, and the intense competition it brings, will ultimately lead to a decrease in the number of physical stores with accompanying effects on the job market (Parker-Strak et al. 2022). Thus, it can be seen that these factors continue to pose challenges to conventional fashion business models.

'Scenario building' and 'backcasting' have recently emerged as viable alternative forecasting methods for envisioning desired future outcomes and defining the steps needed to achieve

them. Their point of difference lies in their design of several alternative scenarios rather than solely rationalising current approaches to the future. Several past studies (e.g. Baumgartner and Ebner 2010; Bibri 2018; Holmberg and Robert 2000) have suggested that scenario planning and backcasting can help delineate new directions and enhance the possibilities of effectively addressing environmentally complex challenges systematically and holistically in the fashion industry. Even though backcasting is becoming popular as a scholarly topic in the realm of future studies, it is less clear how scenario building and backcasting can be used to create more sustainable fashion business strategies. To address this knowledge gap, this chapter aims to shed light on the backcasting approach and evolving scenario-building techniques in relation to developing long-term sustainable fashion strategies.

Trend forecasting and sustainability

There is a growing demand on companies to lift their environmental performance due to escalating public concern about climate change, depletion of natural resources, and decreasing biodiversity. Our natural resources are limited, but current production and consumption rates put excessive pressure on vital earth system processes, such as climate systems or biodiversity, to the extent that the earth is becoming damaged (see Figure 4.1). Environmental issues themselves have undergone an evolution, resulting in larger scale environmental impacts, increased dispersion of carbon emissions, and longer delays in the full manifestation of their consequences (Holmberg and Robert 2000; Raworth 2012).

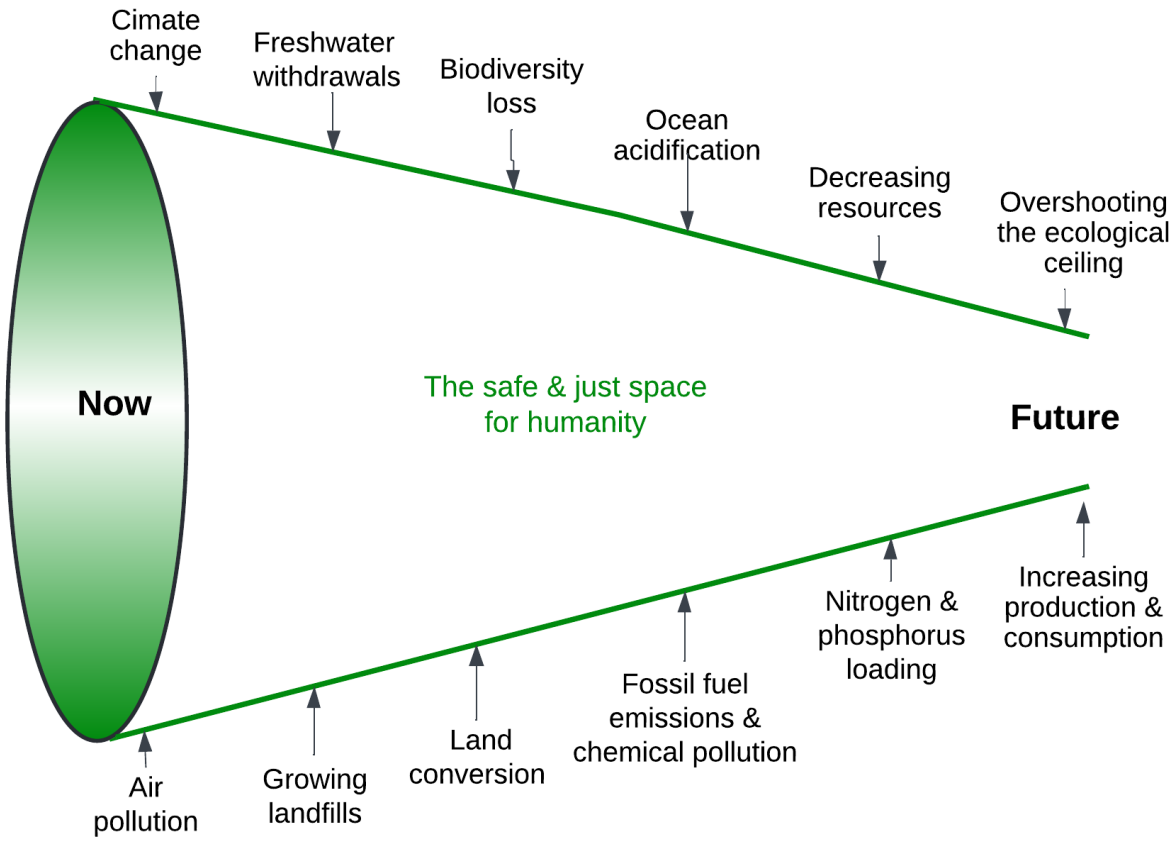

Figure 4.1: Forecasting sustainability impacts
(Adapted from Holmberg and Robert, 2000; Raworth, 2012)

Fashion products are by their very nature trend-sensitive, constantly changing in their styles on a seasonal, monthly, or even weekly basis. As part of the continuous development of new fashion designs, fashion forecasting serves as a catalyst for innovation, promoting an ongoing cycle of change and satisfying the instant thirst for novelty that fashion demands (Carvalho Garcia 2023). The fashion industry has become a more complicated, fragmented international in its structure, and it fundamentally relies on the ongoing mass production and consumption of new fashion garments, and the disposal of outdated fashion (Kozlowski, Bardecki and Searcy 2014). Fashion is often characterised by continuous style evolution through the continuous replacement of seasonal clothing with new garments in response to trends. As the fashion production and consumption cycle spins progressively faster, it directly influences our biodiversity and the environment. The textiles and apparel sectors are very resource-intensive and have a substantial environmental impact on our earth's ecosystem.

A considerable number of negative environmental impacts have been reported throughout the garment lifespan. Environmental impacts occur at every stage of the fashion garment life cycle, from agricultural production, material extraction, and fibre production to fabric processing (such as dyeing, printing and finishing), manufacturing-associated textile waste, transportation, and consumer use (including washing, drying, and final disposal of garments) (Hur 2020). All of these stages of a fashion product lifecycle can have an impact on air and water pollution and soil degradation (Hur and Cassidy 2019). One of the barriers to implementing sustainability in the fashion industry is the complexity of its supply chains, which involve various actors, such as agriculture, fibre and material producers, textile and garment manufacturers, wholesalers, retailers, consumers, resellers and waste management actors. A typical textile and fashion supply system throughout the garment life cycle is depicted in Figure 4.2.

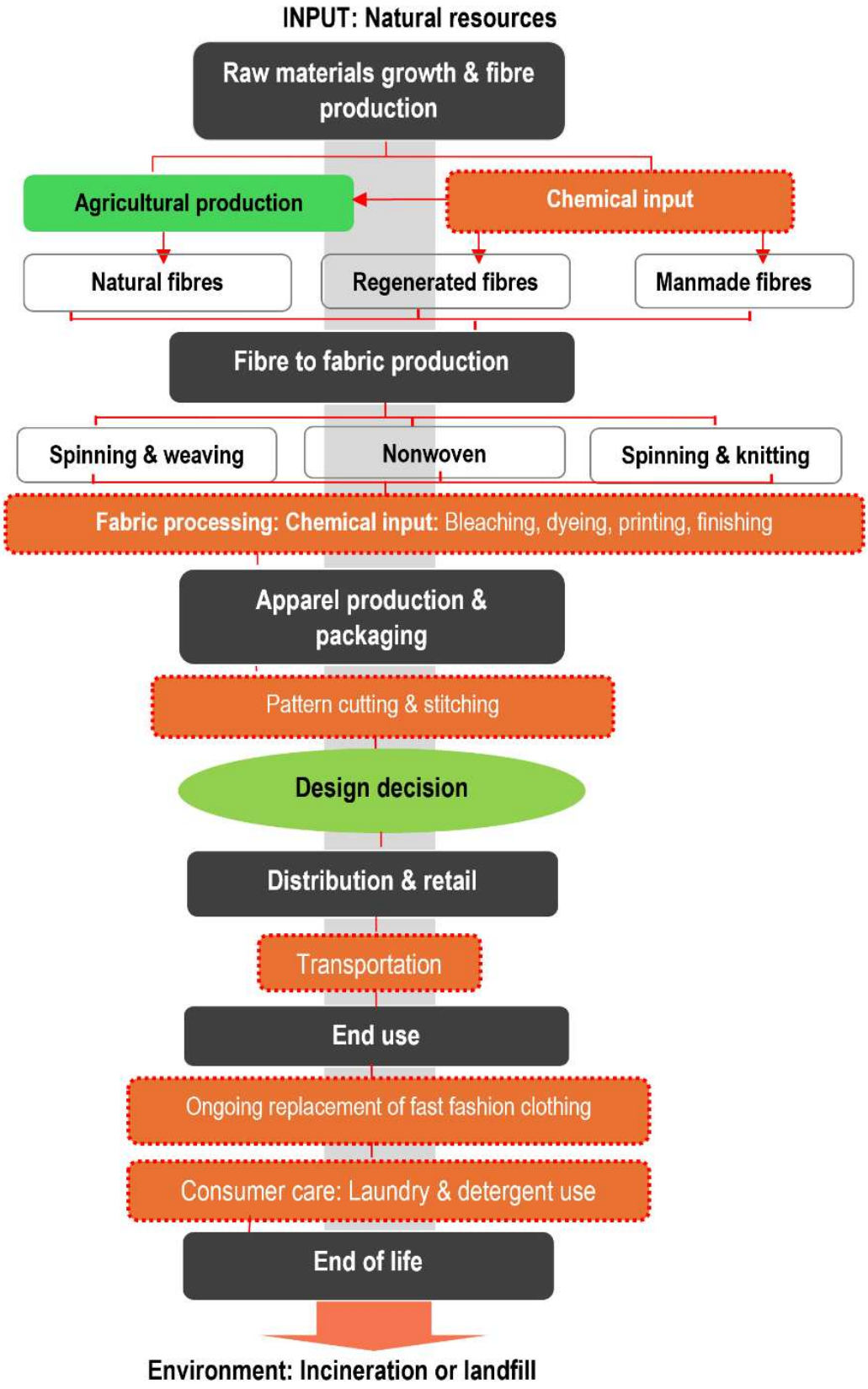

Figure 4.2: Environmental impacts throughout the clothing life cycle

Forecasting in the fashion industry system

Forecasting environmental and social issues in the fashion system can significantly impact the today and tomorrow of the fashion business. The fashion system can be described as a complex network of interconnected subsystems, witness to various forms and degrees of business variability that reshape and transform elements within the fashion value chain. Tham (2008) sees four major challenges to incorporating sustainability in the fashion design process and forecasting future directions. Firstly, there is inadequate oversight of the entire product life cycle, particularly with respect to how the relevant stakeholders can address environmental and social impacts at each stage. Secondly, insufficient attention is given to understanding the complex nature of socio-environmental issues from a systemic perspective. Thirdly, there is a neglect of the symbolic meanings present in fashion, with a consequent failure to leverage the fashion sector's inherent creativity. Lastly, there is a lack of empathy towards consumers and an insufficient appreciation of the need to acquire an understanding of their behaviours to effectively communicate with them. As a way to mitigate the recurrence of environmental and social challenges within the fashion industry, Tham (2008) emphasises that it is imperative to adopt a paradigm shift and implement strategic solutions that facilitate transformative change. Similarly, Holmberg and Robert (2000) point to a lack of systems thinking in the development of strategic planning and forecasting for the long-term future of the industrial ecology.

Efforts to reach a given sustainability goal from a single particular perspective frequently lead to insufficiently optimised procedures that lack integration within the larger surrounding system. Some initiatives yield favourable outcomes in specific domains while generating adverse consequences in others, overlooking trade-offs. A successful understanding of a holistic fashion system would elucidate the interconnections among different issues and resolve them. Although various researchers have declared that systemic and holistic approaches are necessary, defining a system in the fashion industry can be challenging due to the involvement of multiple subsystems. The 'fashion industry system' commonly refers to the production and consumption of products and services. However, the fashion industry system is inherently intertwined with the much wider 'economic industry system', including in its physical, biological, behavioural, cognitive, social, ecological, legal and political aspects (see Figure 4.3).

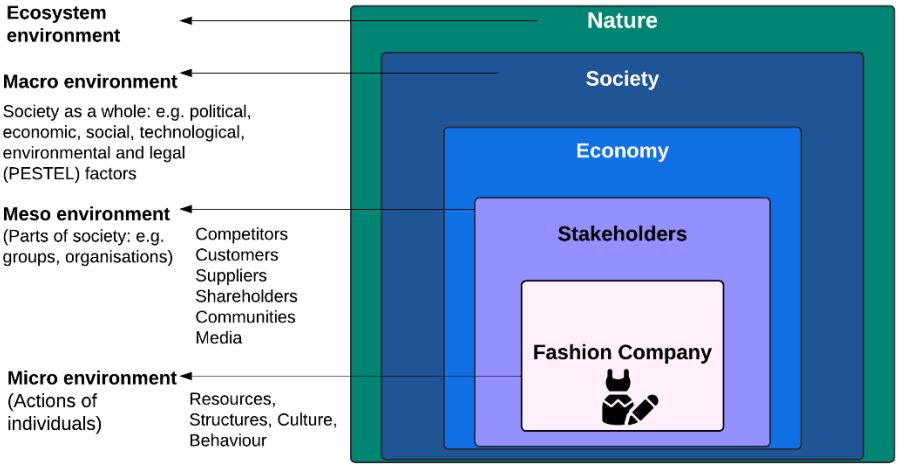

Figure 4.3: Market environment analysis (adapted from Javaid et al., 2019; Saukkonen and Kirjavainen, 2020)

The fashion professionals and organisations that bring value to the design, manufacture, distribution and retail of fashion are all key to the overall consumption of fashion. This process is referred to as the fashion value chain. Adopting a value chain approach involves considering not only the actual operations of manufacturing or farming but also how goods and services are conceived, created, marketed and made available to consumers (referring to the individuals who buy and utilise textile goods worldwide) (UNEP 2023). Both consumers and retailers function as agents in this complicated system, and engaging in interactions and exchanging information through various communication channels.

Short- and long-term forecasting

Forecasters focus on different time horizons in the fashion manufacturing cycle, depending on the type of business in question. The typical horizon for short-term forecasting is often closely linked with the fashion manufacturing cycle (see Figure 4.4). Forecasting offers two primary types of insights to the industry. The first is macro-trends. **Macro-trend forecasting**, also known as **long-term forecasting**, is the analysis of broad-scale cultural shifts and their translation into specific product and marketing strategies. It involves analysing and understanding developments in politics, society, technology, science, behaviour, mindsets and lifestyles. This analysis lays a foundation on which firms may develop or modify their plans at a macro level. In the realm of fashion, long-term forecasting extends beyond conventional aesthetic considerations and delves into a comprehensive examination of sociocultural and consumer behavioural factors. This type of forecasting proves valuable in directing the positioning of brands, communication with consumers, and product portfolio management (Garcia 2022). It is strategic, aiding fashion companies in preparing for significant cultural, social, political, economic, environmental and technical shifts and sustainable growth.

Micro-trend analysis, which is often referred to as **short-term forecasting**, frequently involves forecasting two to three years ahead before the introduction of new products to consumers. The short-term forecaster can make use of past and present information to project into the future. For example, an established textile company will have already received product orders, which allows the forecaster to track the manufacturing preparation process in reverse. The forecaster can also make use of current creative design trends that retailers have incorporated into their decision-making processes, and which are already working their way into the planning stages of garment, fabric, yarn and fibre manufacturing (Brannon 2010).

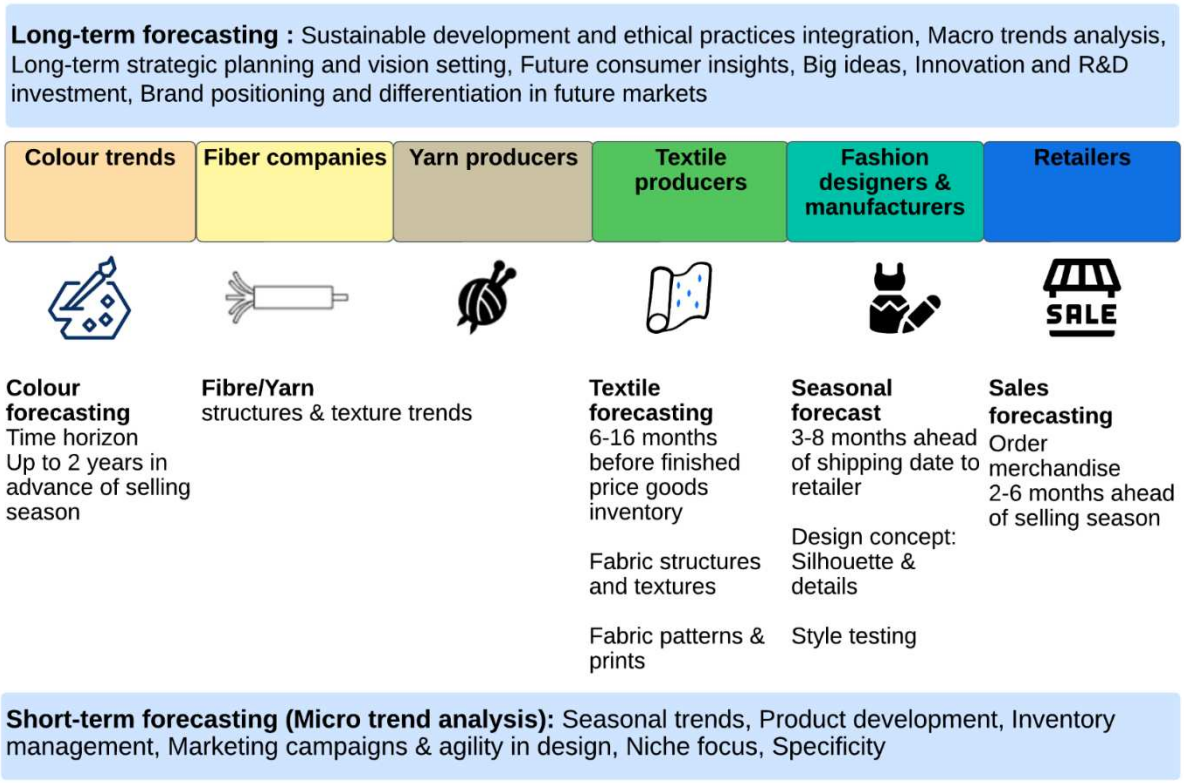

Figure 4.4: Summary of timelines for short- and long-term forecasting in fashion production and consumption (adapted from Brannon, 2010)

These forecasting activities include analysing new colour trends, new fibres, yarns and textiles, textile patterns and fashion silhouette trends (see Chapters 6–8). Colour forecasting is commonly conducted 12–24 months in advance of the next season (see Chapter 6). Fabric fairs and fashion shows showcase emerging trends in textiles one year in advance and fashion design runways at least six months in advance before the target selling season (see Chapters 7 and 8). The long-term prediction report assists in laying out the business's strategic directions and in honing the supplier's commercial expectations. The short-term forecast typically encompasses both essential fashion items that typically see only minor changes in their style, colour or fabric and the more trend-responsive products. The purpose of all these forecasting activities is to ensure that the appropriate colours, yarns, fibres, fabrics and garments are available at the correct time to satisfy specific client demands.

Corporate sustainability strategies

Given the increasing significance of the adoption of sustainable practices by fashion businesses and the escalating environmental concerns within the global fashion industry, several fashion brands have begun to incorporate circularity and sustainability into their core business strategies (Papamichael et al. 2023). In addition, improved forecasting can substantially improve sustainability of products or sustainable practices through the management of supply chain activities, such as inventory or resource control and product or service standards.

Sustainable fashion is most often considered from the perspective of sustainable development. The sustainable development goals (SDGs) established by the United Nations

(UN) are intended to create a comprehensive framework aimed at attaining a more positive and enduring future for all individuals. The 2030 Agenda for Sustainable Development serves as a collective strategy for achieving prosperity and peace for both humanity and the environment, for both present and future generations. The 17 SDGs make up the core of this initiative, which sets forth imperative actions to be taken by all nations in a collaborative worldwide effort (United Nations 2015). They are not intended to be seen as values in themselves but rather as significant milestones towards achieving the aim of a sustainable future. Accomplishing sustainable development (SD) entails ensuring that every individual can access the necessary resources (including clean water, air, food, energy and healthcare) to fulfil their fundamental rights as members of humanity (United Nations 2015).

SDGs are associated with macro-level conditions, such as legal, technological, market, social, cultural and environmental circumstances. When a company incorporates SD, which encompasses the three pillars of economic, ecological and social sustainability, it is essential to consider each element, its consequences and its interconnectedness when developing a coherent business sustainability strategy. Corporate sustainability (CS) encompasses all three of the above-mentioned pillars. It is often influenced by external factors and aims to realise beneficial outcomes for society over an extended period. Baumgartner and Ebner (2010) outlined the relationship between SD and CS, as depicted in Figure 4.5.

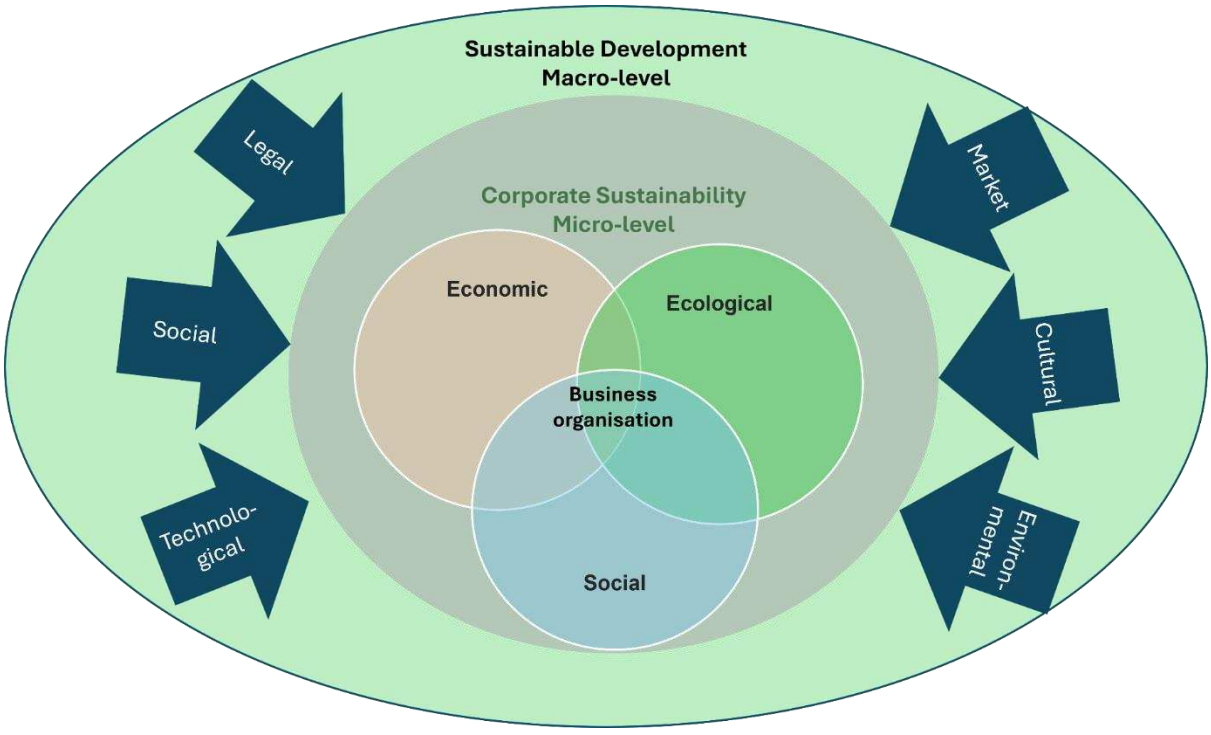

Figure 4.5: Corporate sustainability and its interdependences
(Adapted from Baumgartner and Ebner, 2010)

Environmental and social factors are crucial in operating a fashion business, but addressing the issues can be complex and considered a 'wicked problem', involving multiple decision-makers and linked to the global fashion supply chain system. Social sustainability aims to enhance all current and future interactions with stakeholders, meeting their requirements and thereby ensuring their commitment to the organisation (Baumgartner and Ebner 2010). The

economic element of business sustainability covers commercial innovation and technology, partnerships, knowledge management, operations, purchasing and sustainability monitoring.

Navigating uncertainty: how horizon scanning uncovers weak signals

How can fashion companies create an innovative sustainable fashion strategy by capturing a wide range of weak signals and feeding them into their forecasting approaches? The conceptual foundation of forecasting is largely the forging of projections into the future, which can be done using knowledge from historical data or present-moment information. Fashion forecasting professionals require high-quality inputs drawn from a wide range of sources. Ansoff (1975) established the concept of **weak signals** as a potential alternative or enrichment to strategic planning for future-oriented strategies in business (Holopainen and Toivonen 2012). Ansoff (1975) defined weak signals as preliminary indications-arising from either from external or internal elements-and as and incidents and innovations which are insufficiently developed to allow for adequate evaluation of the consequences or informed decision making. One widely accepted definition of a weak signal is the following: 'A weak future signal is an early warning of change, which typically becomes stronger by combining with other signals' (Hiltunen 2008, 251). Holopainen and Toivonen (2012) noted that a weak signal is a concept or trend that will affect the company or business environment and that has the following key characteristics:

- It is novel and unexpected from the perspective of the recipient of the signal, but others may also be able to see it.
- It may occasionally be challenging to trace among the conflicting noise and signals.
- It offers an organisation a potential risk or opportunity.
- It is frequently dismissed by individuals who claim to have superior knowledge.
- It typically exhibits a significant lag before reaching maturity and gaining widespread acceptance.
- It provides a chance to acquire knowledge, develop and adapt.

Horizon scanning is an essential forecasting technique with which to conduct the above task. This approach enables key decision-makers to identify early indicators of significant developments in macro factors. Armed with the requisite substantial data, forecasters can identify weak signals, which serve as 'future sprouts' indicating the boundaries of the status quo, and point to what lies beyond it (Washida and Yahata 2021). Figure 4.6 illustrates the essential stages involved in the process of recognising weak signals, including horizon scanning, pattern recognition and analysis, contextualisation, testing and synthesis and communicating key findings from trend analysis.

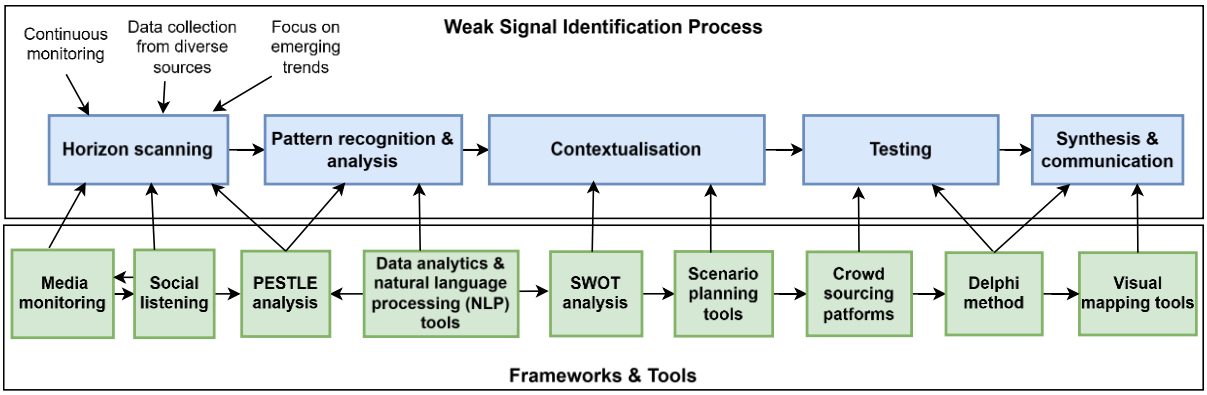

Figure 4.6 Process for identifying weak signals.

The horizon scanning method was initially created by the Stanford Research Institute in 1960 to forecast societal change scenarios (Washida and Yahata 2021). At its core, horizon scanning is the identification of several weak signals followed by the prediction of possible short-, medium- and long-term scenarios. The role of horizon scanning typically involves ongoing monitoring, rigorous data gathering and concentrated attention to emerging patterns and developments. Forecasters employ several tools for identifying weak signals, including horizon scanning platforms, media monitoring tools, social listening tools and data analytics tools. Forecasters use multiple sources, such as fashion shows, newly introduced goods from other brands, influencers, social media research, art and design exhibitions, music, street fashion, fibres, textile and fashion garment trade shows and more. If valuable insights are to result, the abundance of weak signals must be effectively filtered and evaluated. This strategy is based on the PESTLE or STEEP analysis methods (see Chapter 3).

The integration of horizon scanning and scenario planning has been used in several contexts on a global scale to simultaneously analyse multiple scenarios related to the future of societal change or sustainable development. Several future trends can be identified by examining logical consequences and identifying influential factors in the surroundings. Figure 4.7 shows examples of weak signals in the sustainable fashion sector in 2024 and potential future directions for sustainable fashion in relation to current trends. The fashion industry is particularly suited to anticipating the future and using an inherent comprehension of trends to imagine desired futures (Forst et al. 2021). Using horizon scanning can better equip fashion company directors and management teams to comprehend the external environment and the present state and prospects of their organisations. Better comprehension can enable organisations to coordinate their internal resources with the external environment, thereby allocating assets more effectively and rationally.

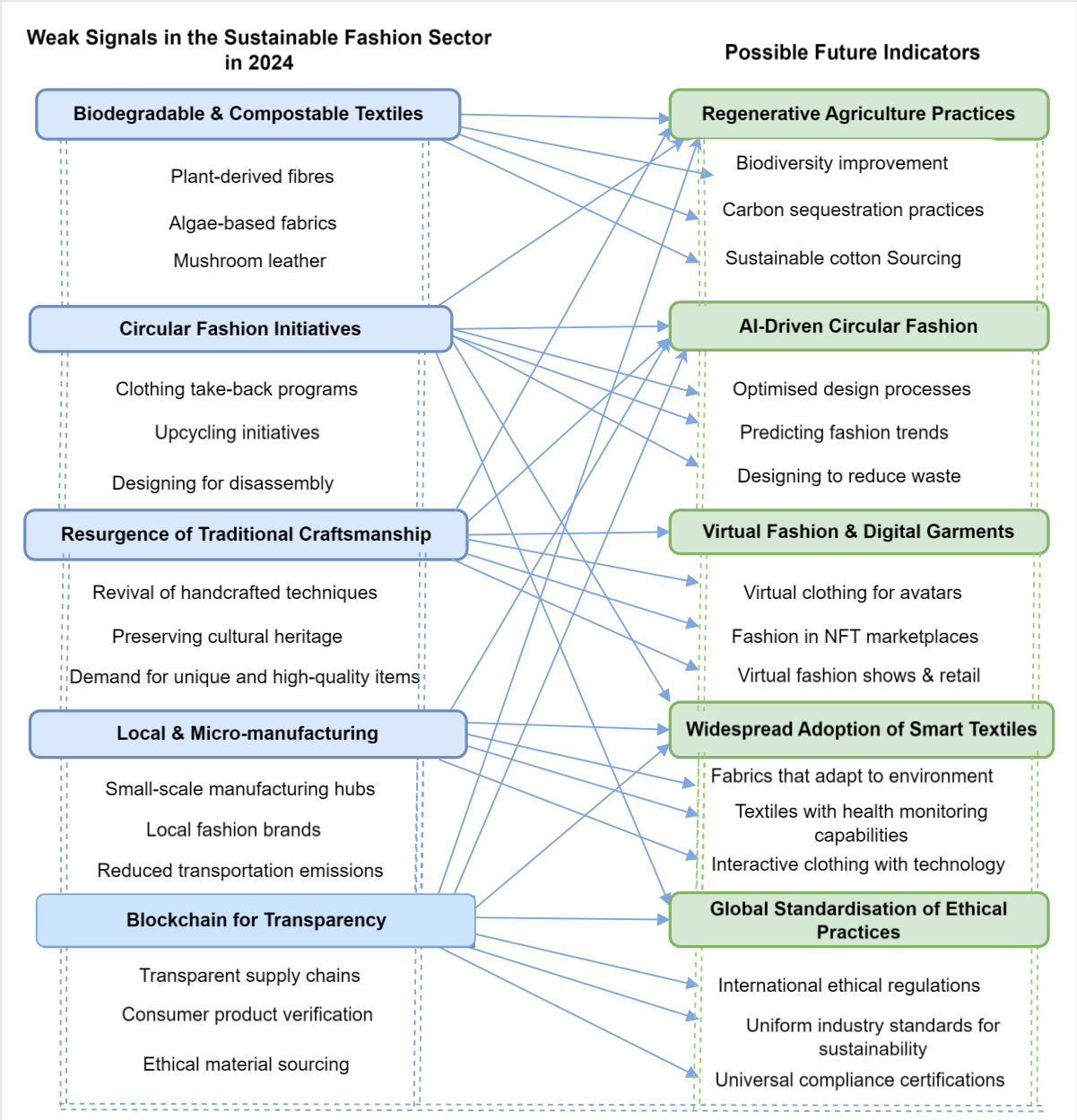

Figure 4.7 Examples of weak signals in the sustainable fashion sector in 2024 and possible future indicators.

Futures Cone and scenario planning

Scenario planning has gradually increased in popularity in recent decades because it enables users to address various ambiguous situations. It has been used to anticipate and address uncertainties and to transition towards more sustainable and circular systems. Scenario planning enables the generation of predictions and the active formulation of potential alternate future advancements relevant to current problems, and adaptable to the various factors in play. Usually presented in the form of narrative descriptions, scenario planning involves creating numerous viable and reliable scenarios that describe various potential outcomes rather than attempting to forecast a particular future (Kishita et al. 2023). When forecasters use scenarios as a foundation for strategic planning, they may develop a collection

of diverse scenarios with which to enhance future strategies in response to circumstances the firm may encounter. Understanding the futures cone model helps forecasters get to grips with the diverse nature of futures and the different possibilities for, and visions of, the future. Hancock and Bezold (1994) employed the futures cone model to depict several potential futures, which encompassed four primary categories: possible, plausible, probable and preferable. Based on their initial approach, Voros (2017) proposed a categorisation of alternate futures consisting of seven distinct futures, which are described as follows:

- **Preposterous:** This refers to future scenarios that we consider to be unlikely or impossible and that will never happen.
- **Possible:** This anticipated future could occur but is highly unlikely, although significant adjustments might still make it possible. Predicting this eventuality relies on information that is currently lacking but that may be acquired in the future.
- **Plausible:** These events go beyond the realm of likely future outcomes, meaning they are not particularly likely but are still feasible and can occur according to knowledge about the functioning of the world, including physical laws and social processes.
- **Probable:** These futures indicate events or outcomes considered probable or likely to occur based on an analysis of present circumstances and trends.
- **Projected:** This future implies an expected default. This is the anticipated outcome if no changes are made or occur. The baseline, or anticipated future, continues from the past to the present. This future is also the most probable future among the several potential futures and the central spot of the futures cone.
- **Preferable:** This future can be influenced by moral beliefs and the desirable future of society, as based on aspirations. Examples of a preferable future include a circular fashion economy and ethical practices.
- **Potential:** This future comprises all possibilities that exist beyond the current moment. This view is based on the premise that the future is uncertain and open rather than certain or fixed.

Based on Voros (2017) and Hancock and Bezold's (1994) interpretations of the futures cone, Goal Atlas (https://goalatlas.com/) adapted the futures cone into five major future directions: preposterous, possible, plausible, probable and projected (see Figure 4.8).

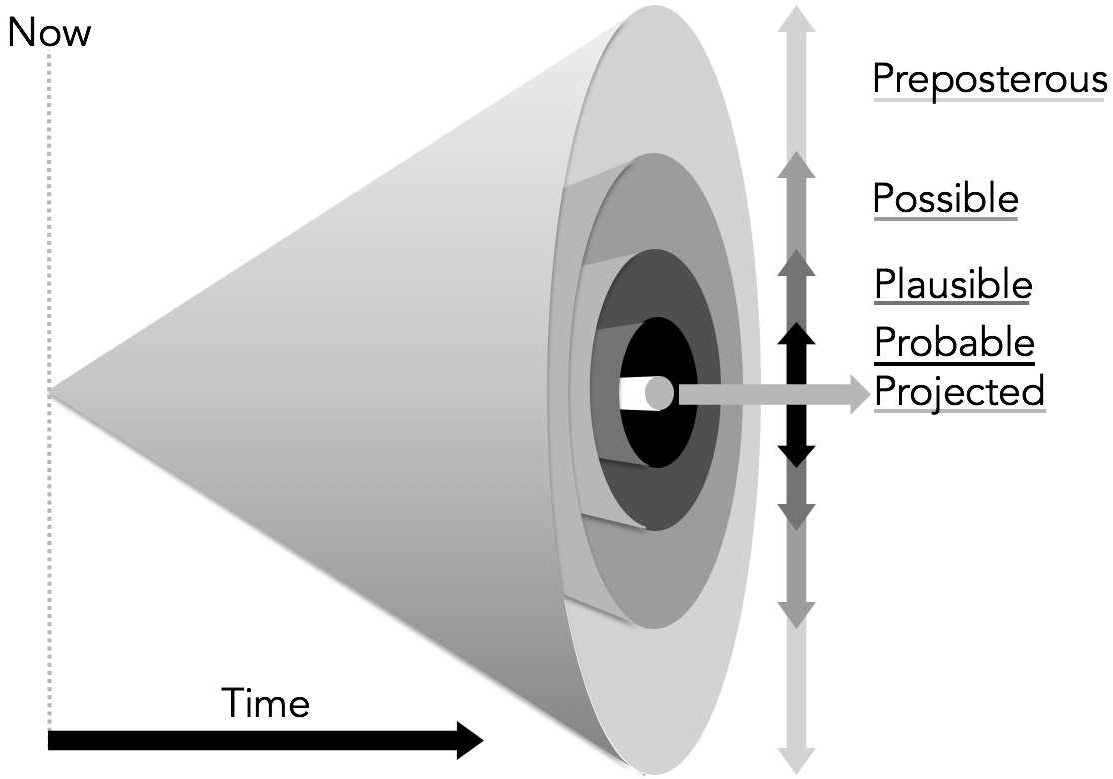

Figure 4.8 The futures cone (from Goal Atlas 2021).

Each researcher and organisation interprets future possibilities in slightly different ways, but the main idea is that future possibilities encompass the process of recognising the implications for strategy and formulating flexible plans for the future (see Box 4.1 and Box 4.2). Nemarundwe, de Jong and Cronkleton (2003) observed that the fundamental concepts of future research require an understanding of the following matters:

- **Uncertainty:** Although it is difficult to know everything and the consequences of our current activities in the future remain uncertain, we must take action.
- **Complexity**: The result can be affected by a multitude of circumstances. Our knowledge of their various causes and their effects on future events is limited, but we must make a decision.
- **Creating vision**: Future scenarios help visualise and project potential future outcomes and help assess how present actions can lead to a desired vision or affect a projected outcome.
  By considering past and current circumstances and issues, alternative future scenarios can be developed with foresight to prepare resilient futures within the desired timeframe.

Scenario planning process

Numerous driving forces can be identified throughout a scenario planning exercise that could be interrelated, based on different presumptions about these macro-environmental factors and significant industrial or consumer lifestyle changes. Researchers have conceptualised the scenario planning process in several slightly different ways, but the main steps follow similar directions (see Figure 4.9).

Authors	Step 1	Step 2	Step 3	Step 4	Step 5
Sardesai et al. (2021)	Scenario preparation	Scenario field analysis	Scenario projection	Scenario building	Scenario transfer
Raymond (2010)	Determining the question & contextualisation	Identification of external drivers & ranking	Scenario framing & building logic narrative	Distillation & refinement	Interpretation & implementation
Kishita et al. (2023)	Problem setting and data gathering	Vision creation and description	Pathway connection and description	Synthesis into scenario description	Scenario evaluation

Figure 4.9 Scenario planning process (adapted from Raymond 2010; Kishita et al. 2023; Sardesai, Stute and Kamphues 2021).

The scenario planning process can be divided into five distinctive stages, based on studies by Raymond (2010), Sardesai, Stute and Kamphues (2021) and Kishita et al. (2023).

Step 1: Scenario preparation: This step involves establishing the project scope and delineating client needs. It includes describing how horizon scanning will be applied to decision field analysis in future scenarios. Raymond (2010) and Kishita et al. (2023) emphasised the need to first define the problem, set relevant questions, and then propose potential future scenarios and possible routes of failure which may result from external forces. For example, a systems collapse or failure.

Step 2: **Scenario field analysis:** Identification of areas and factors of influence is the next step. This step uses the PESTLE variables, along with analysis of megatrends and consumer lifestyles. At this point, all available data, statistics and evaluations of markets in the fashion industry should be gathered to identify external drivers. Chapters 2 and 3 include detailed information on comprehending various external drivers of change from the macro-environment, including examples of several types of frameworks and tools.

Step 3: Scenario projection: This step involves the preparation of important scenario components and identification of projected futures. In this process, forecasters identify the forecasted impacts on the supply chain and evaluate the potential outcomes. Raymond (2010) referred to this process as the scenario framing stage, where logical narrative scenarios are built by prioritising key directions and evaluating their significance and urgency with regards to the initial question. Raymond (2010) made five major scenario classifications, as follows:

- **Best-case scenario:** This scenario exemplifies the bright and best side of the future, when all relevant factors and variables are taken into account. The future promises upside and positivity if the present drivers persist on their present trajectory.
- **Base-case proposition:** This scenario predicts that the future will closely resemble the present, with minimal deviations.
- **Worst-case scenario:** The future appears to be more gloomy than initially projected. This scenario embodies the most unfavourable outcome, characterised by an anticipated deterioration caused by competitor activity and adverse consequences across all domains, including the social, cultural, economic, political and environmental.
- **Cross-case scenario:** The forthcoming situation is more unusual than expected. This scenario serves as an illustrative instance of the inherent unpredictability and absence of absolute purity in many circumstances.
- **Rogue scenario:** This scenario prompts users to question conventional norms and boundaries and promotes unconventional, imaginative and holistic blue-sky thinking.

Step 4: Scenario building and further refinement: This process involves projection bundles and projection-building techniques, future mapping, and the description of the scenario. The process of categorising predictions employs a cross-impact matrix. The visual format of the two-axis matrix has been widely used as the benchmark for business scenario development and scenario planning strategies. This 2 × 2 matrix (see Figure 4.10) allows for more detailed explanation and categorised scenario themes to afford more focus. Raymond (2010) suggests that more clarified scenarios can be crafted by defining the core research question, the title of the scenario, the primary factors influencing macro-trends and which sector or areas they impact, the area of improvement in the business, and how potential macro-trends can offer potential opportunities.

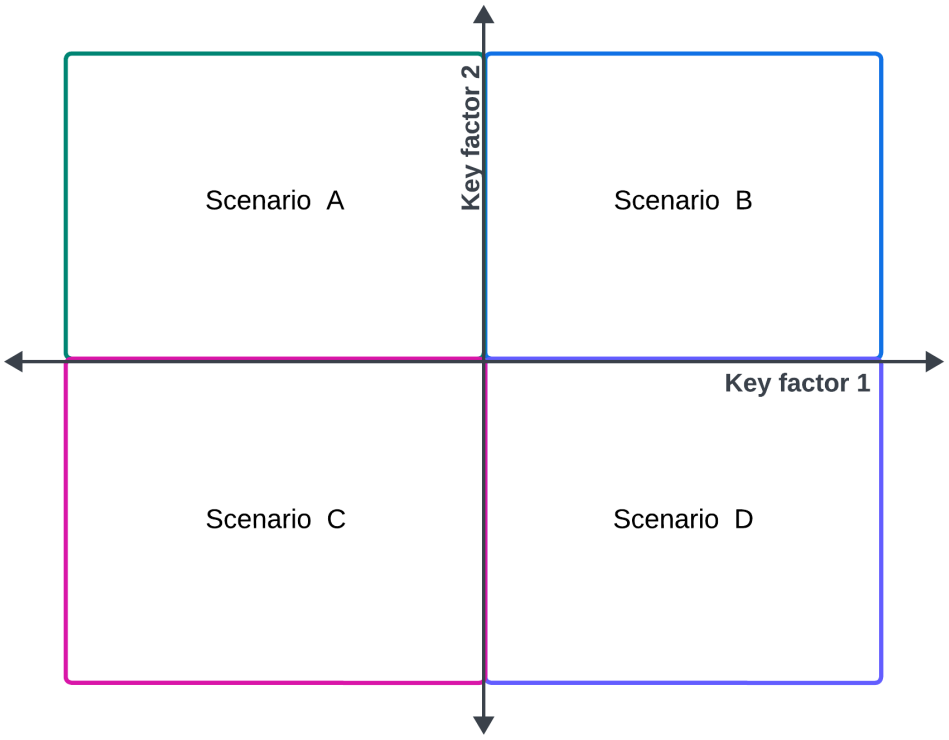

Figure 4.10 The 2 × 2 matrix scenario building technique (adapted from Kishita et al. 2023).

Step 5: Scenario transfer: This process includes analysing the potential consequences, outcomes, opportunities and challenges of the scenario, as well as identifying its strengths and weaknesses, and then developing strategies. The final step evaluates the proposed scenarios based on a specific timeframe for implementing the plan and establishes criteria to measure the plan's effectiveness.

Case study: Arup

Global engineering and design collective Arup's main objective is to create a fundamentally sustainable environment that achieves harmony between the demands of an expanding global population and the limited capacity and well-being of our planet. The company is a consortium of 18,500 consultants, designers and researchers operating in 140 countries (Arup 2024). In 2019, Arup (www.arup.com) proposed four 'plausible futures' for 2050 (see Figure 4.11).

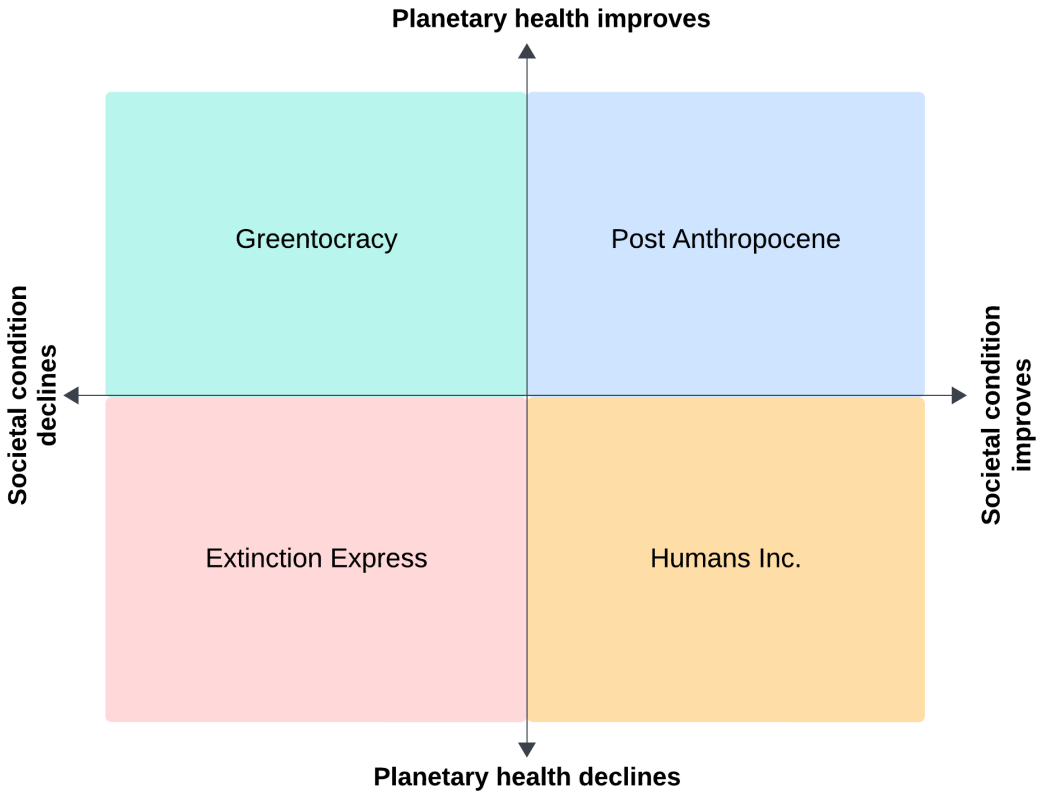

Figure 4.11 2050 scenarios (adapted from Arup 2019).

Post Anthropocene demonstrates the potential for a symbiotic interaction between societal conditions and environmental wellness, where they mutually reinforce each other to the growth and benefit of each. Both humanity and the earth are progressing towards a regenerative world. The rate at which society uses resources is determined by their capacity for replenishment, the diversity of communities, and the healthy balance of social systems. Each person has a carbon limit and daily spending allowance, and state governments could impose penalties for excessive spending. The concept of multiple stakeholders working together to achieve a fair and prosperous future has been successful.

- *Greentocracy* refers to the enhancement of planetary well-being coming at the price of placing extreme constraints on human civilisation, including the imposition of

harsh living circumstances through violence and authoritarian governments. Due to strict ecological regulations, society has become more dispersed and restricted, resulting in a growing dissatisfaction among residents, who feel like mere instruments in the Greentocracy.

- *Extinction express* portrays an ongoing degradation of both the earth's well-being and the state of society. The very end of humanity itself is a subject of debate.
- *Humans Inc.* symbolises today's society path, where socioeconomic conditions progress at the expense of ecological well-being.

Although these scenarios were developed five years ago, they provide very useful insights into how our future society may be shaped in 2050, drawn from relevant scientific information. The guidelines for Arup's scenario building were grounded in science, aiming to address the 'nine planetary boundaries' using Arup's 'Drivers of Change' cards and the UN SDGs. Each scenario is measured against the 17 UN SDGs. A video summarising the four scenario videos is available at: https://www.youtube.com/watch?v=waeysF6h6po&t=2s (Four Plausible Futures: 2050 Scenarios. Arup 2019).

Backcasting

A common way to look at the future in forecasting is by using a perspective of the past. However, several researchers and practitioners have noted that applying past trends to guide or decide future strategy can be risky. This is especially true if these variables are integral to, or perhaps the primary catalysts of, the current issues. Holmberg and Robert (2000) observed that **backcasting** is particularly beneficial when analysing a multifaceted problem that has the following characteristics:

- There is a necessity for significant transformation.
- The presence of prevailing trends contributes to the situation.
- The issue is mostly centred on external variables.
- The subject matter is sufficiently broad, and the time horizon is sufficiently lengthy to enable significant opportunities for intentional decision-making.

Considering the above characteristics, addressing sustainability in the fashion industry is often considered a complex problem. Backcasting is particularly useful to strategic forecasters, macro-trend analysts and sustainability specialists who must establish long-term industry visions and relevant strategies.

Backcasting involves creating scenarios, by first anticipating the potential transitions that society may experience, and then determining the innovations needed to support or avoid those changes (Washida and Yahata 2021). Backcasting is the practice of using visionary and projected scenarios to establish what an ideal future goal would consist of and then articulating the necessary steps, actions or developments to achieve those objectives. Based on a combination of quantitative and qualitative data obtained through workshops, focus groups and Delphi processes, backcasting creates perspectives on the future (Jones et al. 2015). The backcasting method, also known as the normative scenario, is widely used to develop sustainability strategies in various domains, including the transition to sustainability for sociotechnological systems (Faldi and Macchi 2017).

Backcasting is used more effectively when the issue under investigation is complicated with implications across multiple industries and societal levels (Dreborg 1996). In some cases, the demand for systemic change arises when small modifications within the current framework are insufficient. In other cases, it is largely external factors (which cannot be effectively addressed internally) drive the need for significant shifts. Regardless of the origin of the problem, an extended timeframe is necessary to enable significant deliberate decisions to be made when addressing shifts of this scale (see Figure 4.12).

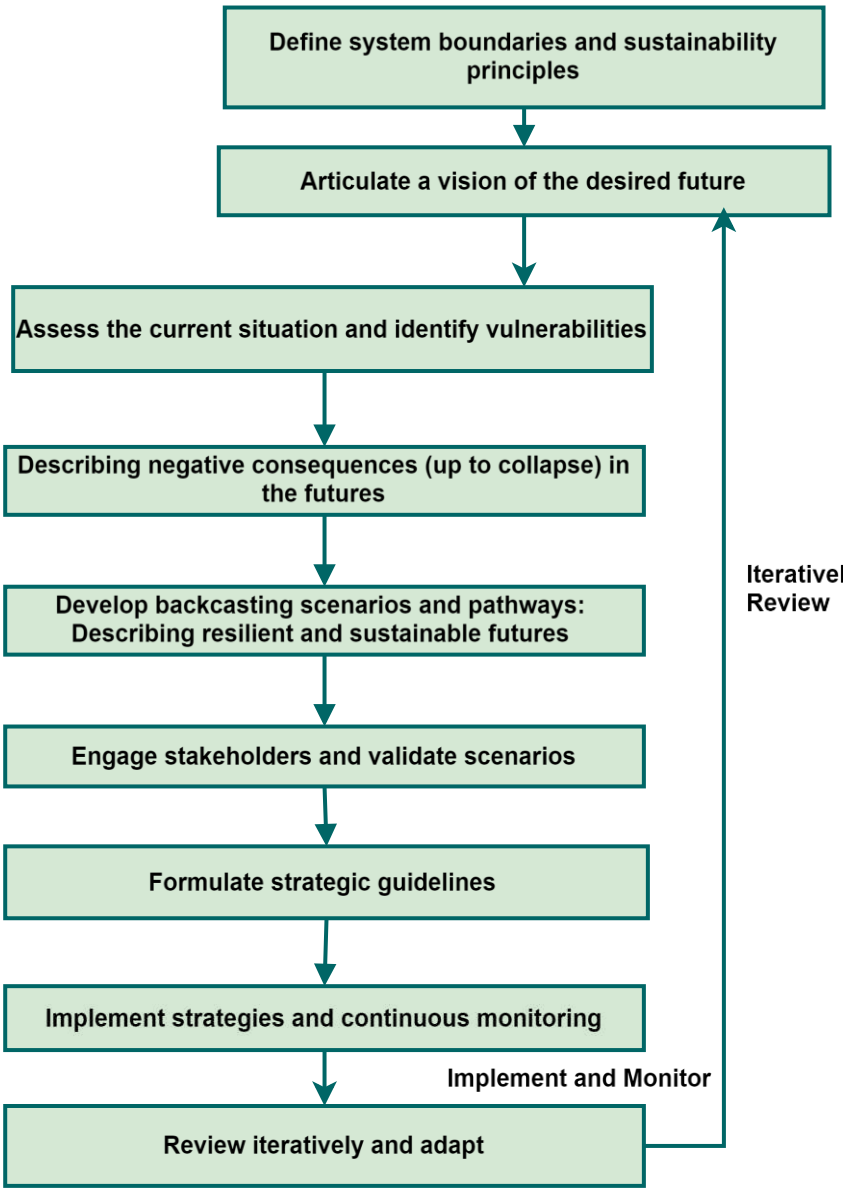

Figure 4.12 Backcasting process (adapted fromHolmberg and Robert 2000; Kishita et al. 2017).

The concept of a resilient future naturally includes the occurrence of, and recovery from, undesirable states, or the system's collapse, or its failure. Kishita et al. (2017) argue, therefore, that the phase 1 of backcasting-understanding the present state-corresponds to phase 2in scenario planning: scenario field analysis. Phase 2 attempts to outline a possible collapse or the negative consequences of future possibilities and pathways induced or

introduced by external forces. In essence, making assumptions about potential negative consequences in the future is unavoidable when attempting to identify the conditions for resilient and sustainable futures. Subsequently, phases 3 and 4 endeavour to establish robust future visions and trajectories by implementing preventative interventions to head off potential catastrophic or undesirable scenarios, and ultimately enhance the system's resilience and future sustainability.

Conducting backcasting plays a significant role in forming an understanding of the relationship between cause and effect. To define the potential futures of the fashion business, it is necessary to analyse the consequences those futures may have, and the conditions required for those futures to become a reality. Figure 4.13 shows the negative consequences of the industry operating as it currently does and the positive consequences that might ensue if sustainability strategies were incorporated in fashion business practices.

The process of backcasting involves constructing pathways from the current situation to a desired future state by tracing back to potential activities in the present and identifying the necessary steps to achieve the desired future directions. Those future perspectives offer guidelines by which the success or failure of different approaches can be assessed in all future studies. Unlike a forecasting approach, which often begins with the current situation as the starting point, backcasting commences by spotting a desired or unwanted future objective and subsequently constructs a pathway that links this vision with the present moment in the reverse chronological order(Kishita et al. 2023).

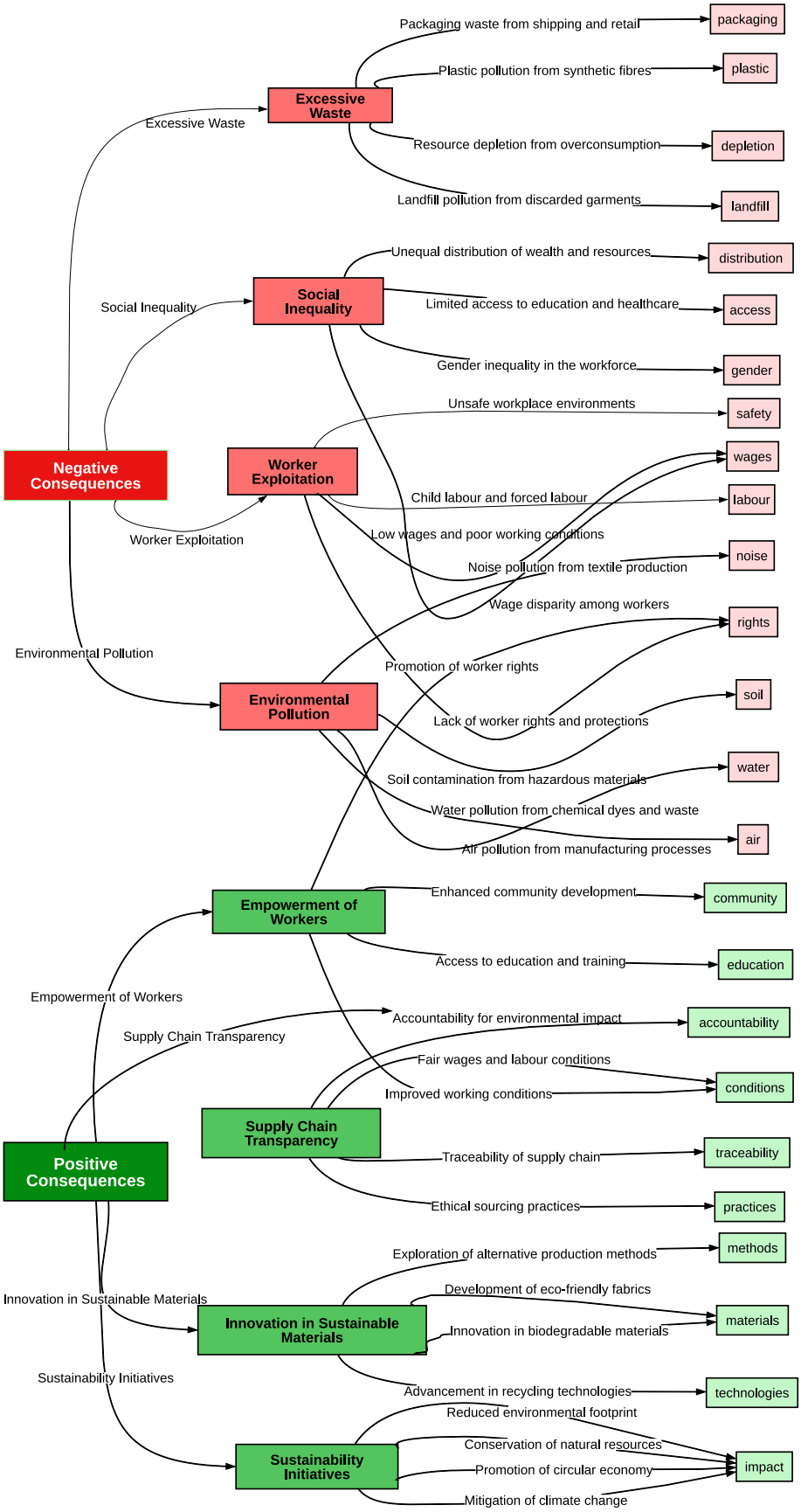

Figure 4.13: Examples of negative and positive consequences and implications for sustainability in the fashion industry.

Case study: the Natural Step International

The Natural Step (https://thenaturalstep.org/) is a nonprofit organisation whose main goal is to enhance the process of shifting towards a sustainable global civilisation. Their framework is based on a scientific, systematic and strategic approach to sustainability, as outlined in the *Framework for Strategic Sustainable Development* (The Natural Step 2012). Their main approach is based on the A-B-C-D framework, which has four components that are reinforced as the business advances across various paths towards sustainability. The approach then progresses based on the company's capabilities, objectives and resources (see Figure 4.14).

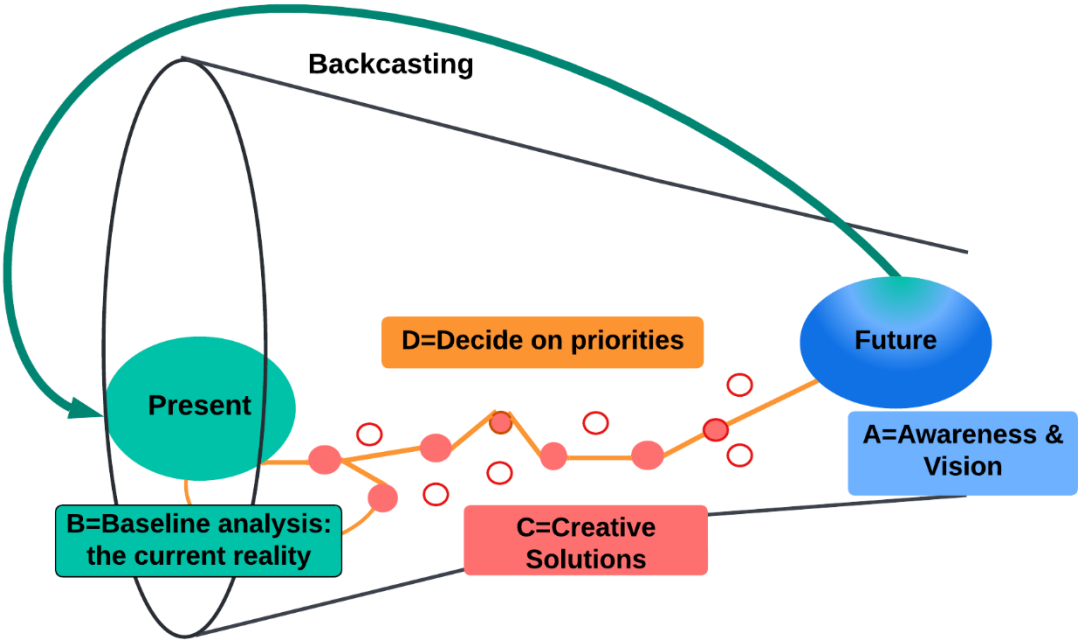

Figure 4.14 The natural step ABCD process.

A = Awareness: The Natural Step's initial stage entails establishing a shared comprehension of the whole sustainability goal and a comprehensive framework of the company.

B = Baseline mapping: Their second evaluation starts with questioning the current structure and design of the company by applying 'sustainability gap analysis' criteria to assess the environmental/social impacts of the business's current operations. It then looks at the business's conditions from a systems perspective (considering both eco-system social and business system) to identify how its operations are contradicting sustainability ideals. This enables the company to recognise crucial sustainability concerns, delineate the implications of and prospects for their business progress and that of their supply chain, and assesses their influence on ecosystems and communities.

C = Creating solutions: Having recognised the disparity between the present reality and the desired destination (vision) of the future organisation, forecasters can examine creative concepts and alternative solutions for getting there. These actions will gradually assist in achieving a sustainable product, service or organisation. Using backcasting, companies create and implement a strategic plan to transition towards sustainability. Strategies are formulated by employing a backcasting approach, which involves working backward from a future desired outcome through yet-to-be-experienced events or yet-to-be-taken actions to the present moment.

D = Decide on priorities and actions: By utilising a series of prioritisation enquiries, forecasters develop a strategic plan that maintains a focus on the objective while maximising adaptability and advantages. Backcasting is a process that is consistently used by Natural Step to evaluate decisions and activities undertaken as they progress the business towards the intended future goal stated in stage C.
<TX1>Combining different approaches from previous studies (Arup 2019; Raymond 2010; Voros 2017), five plausible future retailing scenarios for 2040 are proposed below.

Regenerative fashion retailing

Under this scenario, given the rise in economic volatility and instabilities in politics and climates, there has been a reduction in expenditure on mass-fashion products. Simultaneously, there is an anticipated growth in consumers seeking customised and personalised fashion at a more affordable cost. The fashion environment has been marked by other troublesome occurrences, such as new pandemics, wars and natural disasters. These combinations of causes not only bring devastation to the individuals directly impacted but also carry major implications for global fashion companies trying to establish a more localised fashion system (Gazzola et al. 2020). Regenerative fashion retailing prioritises the ideas of sustainability, ethics and positive social effect at every stage of the fashion production and retailing process, through implementation of regenerative agriculture and closed-loop production and consumption systems, as well as support for local artisans, designers, communities and small-scale producers and the preservation of cultural heritage. The fashion brands serve as catalysts for positive revolution, showcasing regenerative methods for supporting sustainable development (see Figures 4.15 and 4.16).

Figure 4.15 Regenerative fashion (Image: Kalawin 2022).

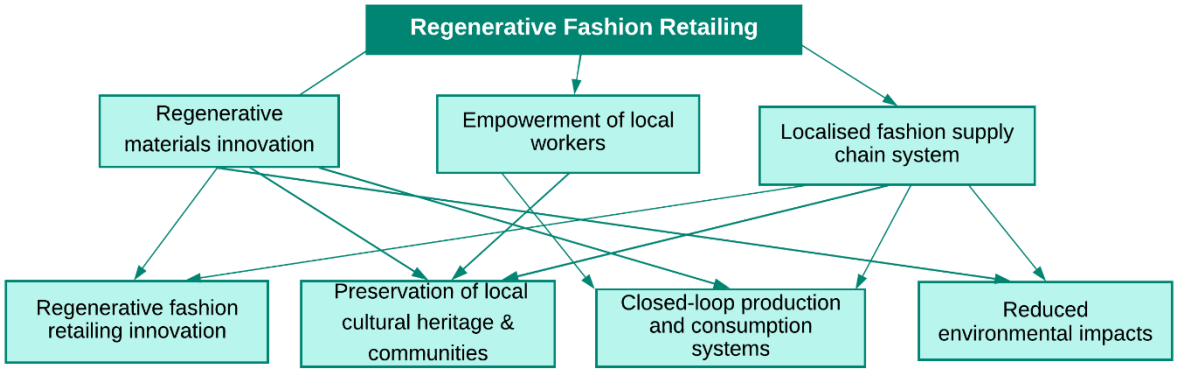

Figure 4.16 Regenerative fashion retailing.

Phygital fashion retailing

<TX1>Embracing new technologies is becoming increasingly popular among leading fashion brands. According to the International Monetary Fund, approximately 40% of occupations globally will be supplemented by, or in severe instances, substituted by, AI (World Economic Forum 2024). Under this scenario, fashion businesses engage in active collaborations with technology companies to provide more personalised and bespoke services that cater to the individual demands of their market across the full consumer journey, whether it be online or offline shopping. This hypothetical scenario is already underway. For example, IBM and Tommy Hilfiger launched a collaborative project, 'Reimagine Retail', which used AI to help create customised experiences along their 'entire fashion value chain', optimising production and advancing brand and consumer relationships (Dtech 2023). Through the utilisation of AI for waste forecasting, categorisation and automated processes, fashion firms can effectively diminish their ecological footprint while simultaneously improving their operational effectiveness (Ramos et al. 2023). A robot continually observes the movement of garbage and independently carries out sorting duties to enhance garment waste management efficiency (Figures 4.17 and 4. 18).

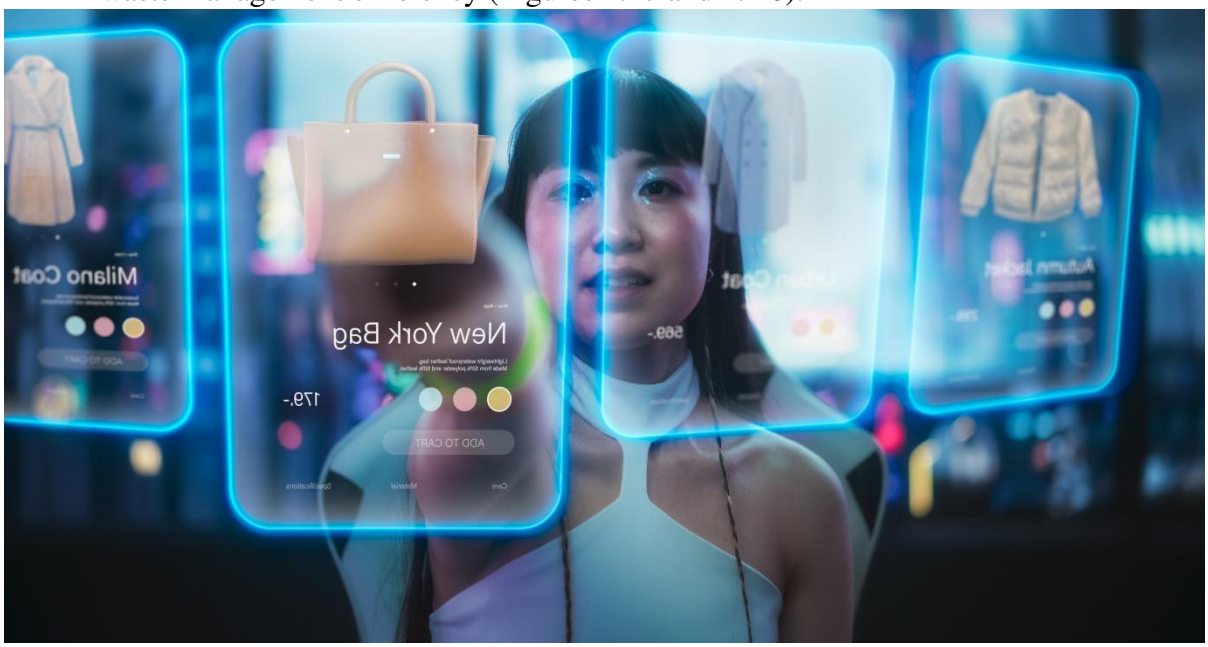

Figure 4.17 Augmented reality platform (image: Gorodenkoff 2023).

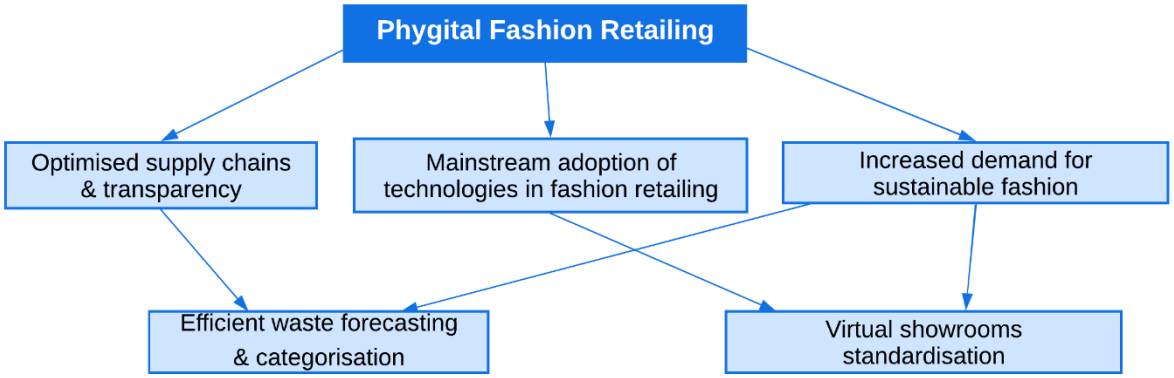

Figure 4.18 Phygital fashion retailing.

Fashion retail in turmoil

Advanced technologies enable fashion businesses to produce products at an ever faster rate through a production process even more globalised than it is today. Added to that, intense competition drives prices ever lower. Consumers wear garments just a few times and replace them at ever faster speeds. Widespread excessive fashion consumption is prevalent. The practices of greenwashing are more prominent, and consumers are often sceptical about sustainability initiatives. Due to this, fashion businesses are trying to avoid green practices due to concerns of consumer backlash. The pollution from garment wastes and the exploitation of natural resources threatens to result in irreversible harm to ecological systems. This leads to the loss of biodiversity and a steeper acceleration of climate change. The fashion industry has garnered even more extensive criticism of itself, with reputational damage accruing as it loses credibility due to its unwillingness to be a competent environmental steward.

Worker exploitation and socioeconomic injustice are widespread. Only wealthy people have access to clean water and are closely connected to the natural environment. Workers in developing countries frequently experience low pay and unfavourable working conditions. Child labour and forced labour occur, and workplaces are unsafe. The wage difference between the rich and the poor is even more severe. Individuals with low socioeconomic status face restricted opportunities to obtain education and healthcare. In developing nations, the increasingly rapid shift in digital trends disrupts conventional garment manufacturing and retailing sectors, resulting in job displacement and unintended negative impacts on the traditional format of brick-and-mortar retailing through store closures. Milman (2024) speculated that the growing electricity requirements of AI require a twofold expansion of data centres to meet the industry's needs. This expansion will result in an 80% rise in emissions that contribute to global warming (Figure 4.19).

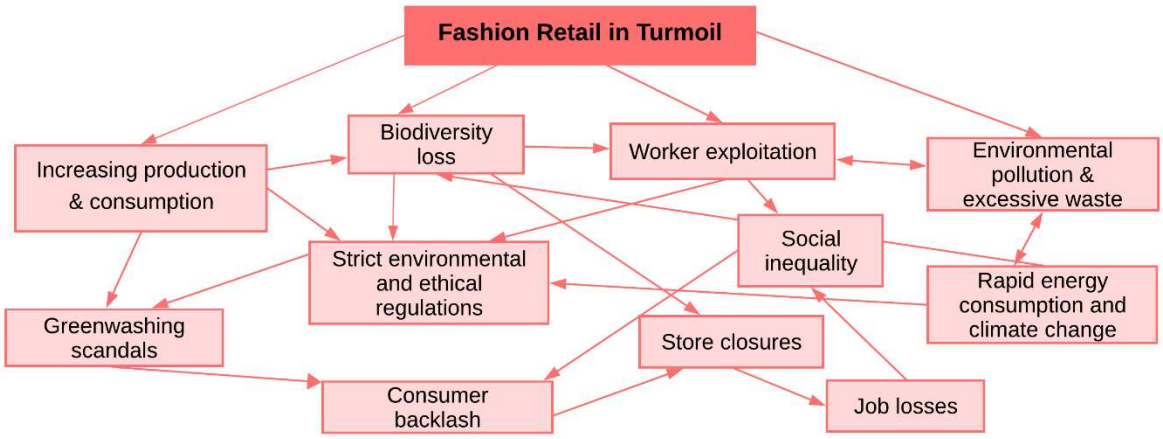

Figure 4.19 Fashion retail in turmoil.

Rogue virtual retailing

As new advanced technologies continue to develop in the future, people find it difficult to distinguish real human interaction from AI-based live chatbots or AI-generated humans. Some brands can manipulate consumer perceptions and offer misleading and copycat products more readily. Consumers start to become more sceptical and more widely distrusting of fashion marketing content. Data leaking can impact an organisation's credibility and the rights of customers. Guha et al. (2021) argued that AI-generated content may reinforce preconceptions and create a sense of bias against customers. The perceived limited emotional value to be found via AI means that fashion brands offer a limited human touch. Health risks from VR equipment, including eye damage and the potential negative psychological and physical effects (Herz and Rauschnabel 2019), are already being discussed in academia, but the issues of virtual reality addiction could be more prevalent when such technologies are widely available to the public. Heikkilä (2024) from *MIT Technology Review* anticipated that AI systems that utilise subconscious or misleading techniques to manipulate behaviour and hinder informed decision-making will take advantage of those who are exposed to harm. In the future, tech businesses must comply with regulations mandating the labelling of deepfakes and AI-generated content, as well as the notification of individuals when engaging with chatbots or other AI systems. The summary of the key consequences of the rogue scenario can be seen in Figure 4.20.

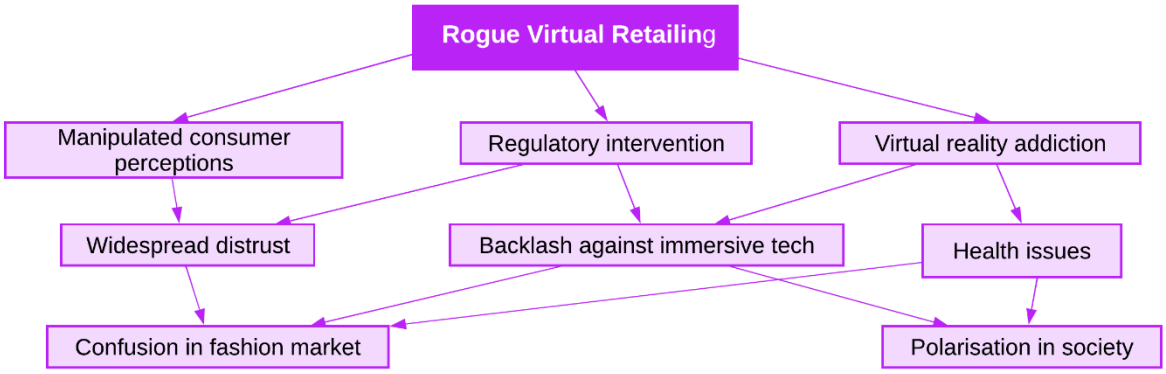

Figure 4.20 Rogue virtual retailing.

Realignment of sustainable retailing

Some fashion businesses strive to tackle sustainability concerns through developing new regenerative materials and leveraging technological productivity to deliver more sustainable production and better consumer experiences. But some companies continue to prioritise immediate financial gains for their business. NGOs, government regulations and education play important roles in incorporating sustainability practices. Achieving a harmonious integration of technological advancements with social and environmental issues is a crucial objective of the business. Through collaboration with fashion industry practitioners, policymakers, academia, NGOs, educators, communities and the public, balanced approaches are promoted to support regenerative slow fashion approaches adapted for technological production in the fashion retailing process (see Figure 4.21).

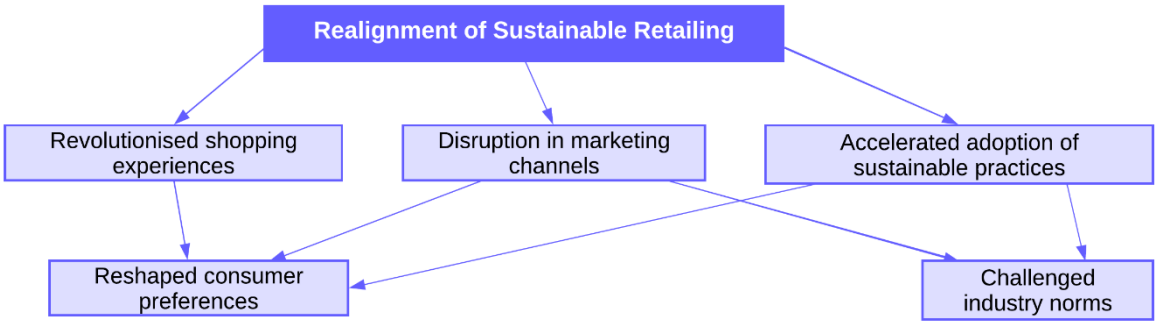

Figure 4.21 Realignment of sustainable retailing.

Chapter summary

This chapter remedies the current knowledge gap by illuminating how scenario planning and backcasting assist forecasting activities in defining long-term future planning and strategic direction. Forecasters are required to examine how divergent future scenarios can result in various outcomes and must possess the necessary understanding of the various types and degrees of consequences their strategies may have on the future. Considering several future possibilities and numerous unanticipated consequences can better prepare planners for this uncertain future environment. An overview has been provided of how fashion companies can use scenario planning methods to develop future retail strategies that address the potential challenges and opportunities in implementing long-term sustainable fashion business strategies and prepare for a more resilient future.

Discussion questions

- You are an owner of or decision maker in a fashion company, or a forecaster servicing fashion industry clients. How will your identified macro-trends impact on the next five years of the fashion industry, two years of your brand and your targeted consumer's lifestyles?
- What are your projected scenarios arising from major global mega and macro-trends regarding fashion retailing and consumers over the next five years?
- What are your suggested long-term strategies for the effective application of CSR and achievement of net zero emissions by 2050 in fashion businesses?
- What are your proposed best-, worst-, and cross-case scenarios for the future of your fashion business?

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