10th International Scientific Conference ERAZ 2024 – Selected Papers
https://doi.org/10.31410/ERAZ.S.P.2024.43

The Contribution of BFs to the SDGs: A Global-Local Comparative Strategic Study

Paola Olimpia Achard[1]
Chiara Bellini[2]
Leonardo Ioannucci[3]

Received: August 30, 2024
Accepted: December 27, 2024
Published: April 5, 2025

Keywords:
Sustainable development;
Biotech firms;
Sustainable development goals;
Strategic management;
Strategic corporate social responsibility

Abstract: *Sustainable Development (SD) has been progressively gaining importance in the strategic actions of businesses for more than a decade. The purpose of this paper is to analyze the strategic contribution of BFs (BFs) to the SD. The methodology followed consists of the analysis of the strategic orientations of major global BFs and the identification of the specific role of (local) BFs in the Abruzzo Region (Italy). The main result of the study is the observation of the areas of sustainability where BFs make their greatest contribution and the ways through which they act.*

1. INTRODUCTION

The biotechnology industry plays a key role in global Sustainable Development (SD) since it presents high levels of growth and works as a boosters for other strategically related sectors (e.g., healthcare, chemical, pharmaceutical, ICT) (Etit et al., 2024). The BFs, the subject of this paper, through the object of their activities and the way they manage their businesses, make a significant contribution to the achievement of the Sustainable Development Goals (SDGs) (Lokko et al., 2018). The 17 SDGs adopted by the United Nations as part of the 2030 Agenda for SD, indicate the interconnected work needed to address global social, economic, environmental and ethical challenges. BFs have distinctive anatomy, that can meet the needs of both science and business. BFs are knowledge-based since they use knowledge and innovation as their main sources of competitive advantage (Bloem & Salimi, 2023). The innovation capabilities of BFs lie in three key processes: i) prospecting and sensing new knowledge; ii) mobilizing and melding knowledge from multiple differentiates and dispersed sources; and iii) deploying, leveraging, and scaling up the innovation (Doz, 2023). BFs are also characterized by the presence of strategic intra-sectoral and inter-sectoral interdependencies (Lin & Lekhawipat, 2023), which support the evolution of the biotech and related sectors through knowledge transfer, which is also prodromal to the pursuit of the SDGs (González-Ramos et al., 2023).

This paper aims to analyze the strategic contribution to sustainability of BFs that, given the characteristics of their activities, are determinants of positive impact on the SDGs (Baumgartner,

[1] University of L'Aquila, Department of Industrial and Information Engineering and Economics, Giuseppe Mezzanotte St., 67100, L'Aquila, Italy
[2] University of L'Aquila, Department of Industrial and Information Engineering and Economics, Giuseppe Mezzanotte St., 67100, L'Aquila, Italy
[3] University of L'Aquila, Department of Industrial and Information Engineering and Economics, Giuseppe Mezzanotte St., 67100, L'Aquila, Italy

2014). Indeed, BFs operate in different sub-sectors of activities that can be distinguished using the color criterion (Iseppi & Rosa, 2022): red (health, medicine, diagnostics), green (agriculture, environmental biotechnology-biofuels, biofertilizers, bioremediation, geo microbiology), white (gene-based bioindustries), and blue (aquaculture, coastal and marine biotechnology). The positive impacts that BFs' innovations generate in terms of the SDGs have been summarized in Table 1, based on information recently made available by the International Council of Biotechnology Association (ICBA, 2024). The ICBA is a coalition of non-profit, national biotech trade associations and represents the biotech industry in international fora for promoting innovation in the human health, agriculture, and industrial and environmental sectors.

The contribution of BFs is mainly evident under SDG #9 and SDG #3. Biotechnology is a key enabling technology that uses living organisms such as bacteria, yeast, plant and animal cells or parts thereof to develop products and processes, which explains the substantial contribution to SDG #9; in addition, the largest share of BFs operates in the red sub-sector (SDG #3). Moreover, BFs, through their distinctive competencies in creating and managing intra-sectoral and inter-sectoral strategic partnerships (SDG #17), foster the pursuit of the other SDGs. The comparative global-local strategic analysis allowed us to highlight the contribution of BFs to SD. At this aim, the paper is structured as follows: i) definition of the conceptual framework deriving from the analysis of the main theoretical contributions of strategic Corporate Social Responsibility (CSR) (Vishwanathan et al., 2020); ii) analysis of the strategic behavior of firms at global and local levels in the pursuit of the SDGs; and finally, iii) comparison of the approaches adopted (global vs local).

2. CONCEPTUAL FRAMEWORK

SD is a global meta-goal, with respect to which firms play a strategic role (Caroli, 2021). Firms are portrayed as both the reason for the global crisis and the solution to it and should be conceived as vehicles of change (Matten & Moon, 2020) in which strategic management must be increasingly oriented toward generating positive sustainability impacts. Sustainability management in BFs fits into the broader framework of strategic CSR, in which innovation plays a key role (Verdecho et al., 2021). Given the strategic peculiarities of BFs, the strategic CSR framework fosters a better understanding of the phenomenon under analysis, although many approaches exist in the literature to support firms in managing sustainability (Velte, 2022). The relationship between strategic management and CSR has been explored and extensively studied in the literature (Kantabutra & Ketprapakorn, 2020) and is a dynamic process in which CSR is not a precondition, but rather one of the relevant dimensions of corporate strategies. Recent literature (Latapí Agudelo et al., 2019) has emphasized the temporal transformation of the concept by highlighting that the main strategic orientation of firms should be the creation of sustainable shared value. The contribution to SD of BFs comes not only from the final outputs of their corporate activities (see Table 1), but also from the way they manage their businesses and the activities involved in value creation (Porter & Kramer, 2018). Although the outputs of BFs' innovation processes contribute to SD, these are not the subject of this paper, which highlights, instead, that the way BFs manage their businesses generates positive sustainability impacts (Mio et al., 2020). For BFs, sustainably managing innovation processes triggers virtuous circles of value creation that lead firms to consolidate their positions of competitive advantage (Achard & Bellini, 2023). In fact, in recent years, BFs have globally adopted innovative and sustainable ways in the areas of drug testing, research and development (Burik, 2024). The analysis of the main dimensions of strategic CSR is dealt with in the top 10 global BFs (which operate in the red sub-sector) by market capitalization (year 2023), shown in Table 2.

Table 1. Biotech's contribution to SDGs

SDG vs biotech contribution	
SDG#1 -Biotech helps farmers increase income and reduce their vulnerability to climate change.	SDG#9 -Biotech R&D is empowering scientists to develop solutions to the most pressing global challenges.
SDG#2 -Agricultural biotech is critical in helping to feed a growing world population.	SDG#12 -Industrial biotech applies tools to traditional processes to more sustainable products and materials.
SDG#3 -Biotech plays a critical role in saving lives and improving the quality of life for all.	SDG#13 -Biotech's agricultural and industrial applications are critical in combating the effects of climate change.
SDG#6 -Biotech helps ensure availability and sustainable management of water and sanitation.	SDG#14 -Biotech can contribute to efforts to conserve and sustainably use ocean resources.
SDG#7 -Biofuels derived from a range of renewable sources reduce CO_2 in transportation fuels.	SDG#15 -Agricultural biotech innovation contributes to the protection of terrestrial ecosystems and biodiversity.
SDG#8 - Biotech innovations present opportunities for economic growth.	SDG#17 -BFs, NGOs, research and multilateral institutions and governments are creating global partnerships.

Source: Own elaboration based on International Council of Biotechnology Association (2024)

Table 2. Top global biotech companies based on market capitalization (2023)

Firm	Market cap *	Firm	Market cap *
Novo Nordisk (Denmark)	302	Gilead Sciences (U.S.)	91.3
AbbVie (U.S.)	260.2	Vertex Pharm. (U.S.)	89.1
Roche (Switzerland)	219.2	Regeneron (U.S.)	87.8
Amgen (U.S.)	139.6	CSL (Australia)	75.7
Bristol Myers Squibb (U.S.)	119.5	Moderna (U.S.)	39.2

*values in Billion dollars (U.S.)

Source: Own elaboration based on data available on Statista (2024)

Table 3. Purpose of global BFs selected

BF	Purpose
Novo Nordisk (Denmark)	*"We turn ideas into better treatments for people living with serious chronic diseases".*
AbbVie (U.S.)	*"AbbVie discovers and delivers innovative medicines and solutions that enhance people's lives".*
Roche (Switzerland)	*"Doing now what patient needs next".*
Amgen (U.S.)	*"In everything we do, we aim to fulfill our mission to serve patients. And every step of the way, we are guided by the values that define us".*
Bristol Myers Squibb (U.S.)	*"We are … the latest science and technology to help improve lives through the research and development of new medicines for serious diseases".*
Gilead Sciences (U.S.)	*"Helping to Create New Possibilities for People with Primary Biliary Cholangitis".*
Vertex Pharm. (U.S.)	*"We invest in scientific innovation to create transformative medicines for people with serious disease".*
Regeneron (U.S.)	*"Push the bounds of science, make life change medicines".*
CSL (Australia)	*"CSL's offerings are more diverse than ever to help ensure patients and people everywhere get the treatments they need. We're always improving so life can, too".*
Moderna (U.S.)	*"We embarked on this journey with the goal of making drugs developed from mRNA a new reality that can change the world".*

Source: Own elaboration based on the information available on corporate websites

Strategic CSR is an opportunity for firms to reconfigure the competitive landscape and develop distinctive and dynamic resources and capabilities. The concept of strategic CSR can be traced back to the integration of sustainability dimensions into corporate strategic directions, how strategic goals are pursued, and how competitive advantage is achieved (Marakova et al., 2021). In the context of strategic CSR, the value created is declined in the economic, social, environmental and ethical dimensions. The creation of shared value (Menghwar & Daood, 2021) is focused on identifying, developing and enhancing the interdependencies among the identified areas of sustainability. Indeed, the value creation of BFs is appreciated in the economic, social, environmental and ethical spheres. The economic sphere was taken as the initial reference (see Table 2), while the others are explored in more detail in the following discussion. More recent studies highlight that strategic CSR is geared toward the creation of shared value, but from a sustainable perspective (Chandler, 2022). This aspect can be found in all the global BFs included in the analysis, for which community benefits and SDGs are an integral part of corporate purpose (George et al., 2023) as shown in Table 3. This characteristic is in line with the strategic factors that characterize the biotech industry, among which the management of innovation and knowledge through strategic interactions of a collaborative nature assume greater importance.

Global BFs contribute to SD through the sustainable strategic management of their innovation processes (Voegtlin & Scherer, 2017), which are based on: i) management and engagement of key stakeholders; ii) integration of strategic goals with economic, social, environmental, and ethical sustainability objectives; iii) reconfiguration of value-creating activities from a socially and environmentally sustainable perspective; and, finally, iv) design of organizational mechanisms that foster the integration of sustainable practices into the organizational structure. The interconnected management of human resource management, internal communication and innovation activities is one way to appreciate the integration of sustainability into strategic business action (Stahl et al., 2020), of which AbbVie is an example. AbbVie is a global BF, established in 2013 in the United States as a spin-off of Abbott Laboratories. To date, it has doubled the number of human resources to more than 50,000 with a widespread presence in more than 70 countries globally. Just under 60% of the staff are women, 52% of whom hold managerial positions. About 20% of the human resources are directly involved in Research & Development (R&D), the firm's core business, in which it has invested more than $55 billion since the beginning and has nearly 2,000 scientific publications. These strategic goals have also been achieved through the use of multidisciplinarity and multiculturalism in research teams with the aim of enhancing their innovative capabilities arising from diversity (SDG #4). This management is in line with another strategic factor that connotes the entire industry and that concerns collaboration strategies. As of 2022, some 250 agreements with strategic partners are active (SDGs #17), including competitors, universities, non-profit firms, and government organizations. Attributing strategic relevance to CSR for firms means moving to corporate governance that: i) rethinks the concept of stakeholders (Freeman, 2023); ii) adopts stakeholder management strategies differentiated according to the degree of involvement in decision-making processes (Colvin et al., 2020); and iii) emphasizes the role of collaborative strategies based on enhancing the interdependencies among actors/businesses belonging to the public, private and social sectors (Achard, 2019). From a strategic perspective, stakeholders can also play a role as drivers of the evolution toward sustainable corporate management. Exemplary in this regard is CSL, a global BF founded in 1916 in Melbourne, Australia, owned by the Australian federal government and privatized in 1994. The firm operates in the businesses of research, development, production and commercialization of biotechnology products, predominantly, plasma derivatives (SDG #3). Stakeholder engagement (Stocker et al., 2020) (SDGs #4; #17) is a strategic activity carried out through periodic assessment processes based on sharing material issues to update and inform the

sustainability strategy pursued. CSL's stakeholders articulate, according to the interdependence that exists between the issues associated with them, into: internal (employees), external (research partners, shareholders investors, business partners, potential employees, healthcare professionals, customers), primary (patient groups, research partners and plasma donors), secondary (media, public health consumers) and institutional (regulators, governments, debt providers). By way of illustration, the primary stakeholders, given their relevance to CSL's businesses, are patients, who are involved in R&D processes with marketing strategies and with whom are primarily discussed the issues related to: i) access to therapies; and ii) improving participation in R&D processes, innovation, safety, and product quality. In addition, the evolution towards a CSR-based management approach is confirmed by the establishment within the organizational structure of the Executive Committee for Sustainability, which reports directly to the CEO, coordinated by the Chief Corporate & External Affairs and the Heads of strategic support functions: finance, sustainability, legal, human resources management, R&D and external relations management (investors). In the area of internal stakeholder management, the case of Novo Nordisk is interesting because of its emphasis on the link between CSR activities and corporate performance evaluation (the connection between strategic and organizational control) (Awa et al., 2024). Novo Nordisk is a global BF established in 1989 in Denmark from the merging of two firms, Novo and Nordisk, both engaged in insulin production. Novo Nordisk has adopted a value-based management system supported by specific strategies and policies in key business areas, including finance, environment, and social. The staff performance evaluation process is based on shared local and corporate (Executive Board and Board of Directors) responsibilities. For example, in 2023, 42 organizational units were evaluated and about 2,300 employees (about 8% of the total) were interviewed individually. In terms of social value creation, Novo Nordisk involved primary stakeholders (about 550) in the assessment process (SDG #4). The rationale for value creation was based on the link between the strategic goals and the internal goals of the organizational units involved. In the broader perspective of shared value creation that best fits the purposes of this paper, pursuing SDGs implies that the strategic action of firms goes through the ability to rethink services and redesign value chain and value system activities. Firms can compete by adopting a strategic approach that leads them to create shared value, in terms of societal benefits, while improving firm competitiveness (Mai et al., 2021). Amgen Inc., recognizing the strategic relevance of ethics to its businesses and to consolidate its competitive position, has outlined a strategy for managing its suppliers based primarily on sustainability dimensions (SDGs #3; #4; #12). Amgen Inc. is a global BF founded in California (USA) in 1980. Ethical business practices, labor and human rights, health and safety, environment, management system and supply transparency are the requirements on which the supplier selection and evaluation processes are based, throughout the business agreement. Adherence to Amgen's ethical principles is not formal, but substantial, i.e., suppliers are required to make it formally explicit that they meet and integrate compliance with the Supplier Code of Conduct into their business actions, which is an integral part of the agreement. In this way, suppliers support Amgen Inc. in its processes of creating shared value with patients, local communities and other supply chain actors (e.g., distributors) by supporting the firm to generate positive social and environmental impacts (López-Concepción et al., 2022). Along the same lines Amgen, but from an intern stakeholder management perspective (Bhattacharya et al., 2023), stands Regeneron. This firm was founded in 1988 in New York and is active in R&D, manufacturing and commercialization of innovative drugs. Regeneron has a Code of Conduct and Ethics based on a collaborative strategic approach grounded on shared responsibility and commitment among human resources. Ethics is a key dimension of innovation processes (SDGs #3; #4; #5; #12; #17) through: i) clinical trial data and information sharing (transparency); ii) animal welfare; iii) good operating principles in operations, manufacturing and distribution; iv) monitoring safety and quality of processes and products.

The integration of CSR is a challenging and progressive process over time and involves the inclusion of economic, social, environmental and ethical sustainability factors in firms (Nguyen & Kanbach, 2024), in which a relevant aspect is the ability to manage the strategic interdependencies among the factors mentioned. The strategic choices of Vertex and Bristol Meyer Squibb better clarify the role of environmental choices in the firm-society relationship (Risi et al., 2023). Vertex is a BF founded in 1989 in Boston, now engaged in R&D in therapeutic areas for the treatment of serious diseases without a cure. Vertex recognizes the strategic interdependence between the firm's value-creating activities and the well-being of the Communities (Carroll, 2021) of the geographical areas in which it operates. In this regard, it has adopted environmental strategies (SDGs #6; #12; #13), at the global scale, to contribute to climate protection and the promotion of a healthy and sustainable outlook through: i) reduction of greenhouse gas; ii) conservation of water; iii) minimization of waste; iv) adoption of green chemistry practices; and v) promotion of workplace safety. To this end, Vertex, to facilitate the integration of corporatelevel environmental strategies into the organizational structure of the firm, has designed horizontal structures (cross-functional teams and cross-functional Sustainability Committee) that serve the purposes of coordinating, supervising, and implementing sustainability goals in the strategies of individual business units. Bristol Meyer Squibb, on the other hand, has extended its environmental strategies to other key activities. Bristol Meyer Squibb is a global BF, formed in 1989 in New York City following a merger between Bristol-Myers Company and the Squibb Corporation. Its environmental value creation (SDGs #6; #7; #12) is achieved through: i) reduction of pharmaceuticals in the environment; ii) inclusion of sustainability criteria in the selection of strategic partners; iii) green and sustainable science (sustainability in science and drug development); iv) sustainable packaging; and v) sustainable transportation. All these aspects directly affect the effective management of the most impactful supply chain stages in drug lifecycle management.

Finally, it has to be mentioned Roche as an example of the integration of different dimensions of sustainability elevated to a driver of business governance. Roche was founded in 1986 in Switzerland and, today, Roche Holding AG wholly controls BF Genentech (USA) and is the majority shareholder (62%) of BF Chugai Pharmaceuticals (Japan). Roche has developed an integrated governance approach to pursue several SDGs (SDGs #3; #4; #5; #6; #7; #8; #9; #12; #13; #16; #17). The governance model of Roche has also evolved significantly through the establishment of organizational units to oversee sustainability: (i) the Corporate Governance and Sustainability Committee of the Board of Directors (BoD), which serves as an internal advisor to sustainability strategies and is accountable to the BoD; (ii) the Corporate Executive Committee (CEC), that is responsible for planning corporate strategies and delegates, coordinates and manages the Corporate Sustainability Steering Committee; (iii) the Corporate Sustainability Steering Committee, which defines the sustainability strategy; (iv) the Corporate Sustainability Operations Committee, responsible for sustainability programs, their implementation in the corporate organizational structure, reporting and verification of the pursuit of objectives in all global organizational units. Finally, the Global Sustainability Network created by Roche supports the alignment of all foreign subsidiaries to act with a view to the internal and external creation of shared value.

3. METHODOLOGY

The methodology followed in this paper is qualitative and comparative, and given the strategic peculiarities of BFs, it was included in the conceptual framework of strategic CSR. The analysis of BFs' contribution to SD was divided into three parts:1) Identification of the top 10 leading global BFs, selected based on the market cap criterion (see Table 2) (Statista, 2024). Next, their strategic

orientations to economic, social, environmental and ethical sustainability were studied. The results of this first part were used as a benchmark for comparison with what emerged from the analysis of local BFs. 2) Definition of the panel of local BFs operating in the Abruzzo region (Italy), based on the convenience sampling method, and detection of the economic, social, environmental and ethical sustainability strategies pursued. 3) Overview of strategic evidence from the global vs. local biotech comparison. To study the BFs that constitute the described setting, it was deemed appropriate to analyze the following strategic documents: strategic plans, sustainability plans, and annual reports (Tsalis et al., 2020). The choice of these three types of documents stems from three interrelated aspects: i) checking their accessibility (transparency); ii) accessing information relevant to this analysis; and iii) appreciating the degree of coherence and interconnectedness among the various documents, since it is, in part, an expression of the level of integration of sustainability issues into corporate strategies. The documents were accessed through consultation with the corporate website. The choice of in-depth study of individual issues of strategic CSR in the firms was made on the basis of relevance, relative to the purpose of the paper, and the representativeness they have for each firm studied. In section 4, we report on the analysis of local BFs with the aim of studying a narrower set of firms in the context of an Italian region where the industry is still in a growth phase and verifying whether the sustainability and SDGs orientation of local BFs is aligned with the strategic choices pursued by global BFs.

4. RESULTS

More than 1,200 BFs operate in the Italian biotech industry, in which about 14,000 human resources are employed. The red sub-sector is the most significant in terms of turnover, determining 74% of the Italian biotech industry's turnover, and R&D investment (85% of the total). Abruzzo is located in an area where BFs are growing and developing. In Abruzzo, 35 BFs are active (3% of the total) and operate about 70% in the red sub-sector while the remainder in the yellow (about 15%) and green (about 15%) sub-sectors. The contribution of local BFs to SD is appreciable, albeit to varying degrees, in three areas: social, environmental and ethical. Local BFs actively promote social sustainability through corporate welfare policies and by investing in the welfare of local communities. Some firms have also undertaken social responsibility initiatives that include volunteer programs and collaborations with local non-profit organizations. Environmental strategies adopted by local BFs include measures to reduce the environmental impact of business activities through the adoption of clean technologies and waste management practices. Previous research indicates that many firms have implemented certified environmental management systems (e.g., ISO 14001) and that some of them regularly monitor their CO_2 emissions. Although the regional average is around this type of choice regarding environmental sustainability, there is no shortage of cases of more advanced firms. For example, a local BF active in the red sub-sector and engaged in research and production of plant extracellular vesicles has developed a business model based on the circular economy. Local BFs, given the nature of their businesses (R&D; manufacturing), adopt strict ethical standards, ensuring transparency and integrity of their activities. Most firms have formal codes of ethics and offer ongoing training programs on ethical responsibility to the staff. Attention to these dimensions can be also explained as a specific response to the legal-institutional factors (Wæraas, 2020) that characterize the macroenvironment and is also aimed at attracting investors, especially international ones.

Through the pursuit of sustainability strategies, local BFs contribute to the achievement of the SDGs, with a focus on SDGs #3, #9, #7, and #17. Local BFs have started the process of integrating the SDGs into their corporate strategies and some of them have promoted specific projects

to contribute to SD through rethinking the way they conduct relevant activities in innovation processes (e.g., green supply chain; circular economy). The strategies pursued by local BFs in strategic CSR are comparable and partially aligned with those adopted by global BFs, especially in the environmental and ethical dimensions. Regarding the social sphere, on the other hand, differences and less implementation are appreciated in local firms compared to global ones, and this can be explained, in part, by the dimensional differences (number of active human resources, number of geographic areas in which they operate, low degree of cultural differentiation of human resources) that characterize the two groups of firms. Also, regarding communication choices of the sustainability strategies pursued, transparency (e.g., accessibility to strategic planning documents Strategic Plan, Sustainability Plan and Annual Report), completeness and updates of corporate websites, local firms still have fair room for improvement. Finally, in local BFs, unlike global ones, sustainability has not yet found its place at the organizational level (e.g., committees, specific inter-divisional and inter-functional groups). The comparative analysis, therefore, highlights that the sustainability orientation of local BFs is at an early stage compared to global BFs. The latter, in fact, are committed to their legitimacy with respect to the requirements set forth (in the social, environmental, and ethical spheres) by the directives, regulations, and laws that characterize their macroenvironment of reference. Global BFs, on the other hand, are undertaking initiatives to innovate their business models and governance arrangements so that strategies to achieve competitive advantage are also effective in contributing to SD and vice versa.

5. FUTURE RESEARCH DIRECTIONS

Considering the findings from the comparative study and the stimuli from the strategic actions of global BFs, possible future research trajectories are identified. The latter may concern the study of a positive correlation between the innovative capabilities of BFs and their degree of development with respect to the adoption of a governance approach marked by the dimensions of strategic CSR. Given that BFs pursue collaborative strategies to foster knowledge sharing to support innovation processes by activating virtuous circles of value creation, it might be challenging to investigate whether these firms integrate sustainability criteria to select strategic collaborations. Finally, from a strategic point of view, it is interesting to conduct a double-time measurement to appreciate the further evolution.

6. CONCLUSION

BFs, being knowledge-based firms, contribute to the pursuit of the SDGs both through the performance of their businesses and in the way they manage the key activities involved in the processes of innovation. BFs generate and distribute value, including environmental, social and ethical value, to all their stakeholders through the adoption of sustainable innovation strategies that enable them to: i) reconfigure the activities of the value chain and system, ii) redefine the pool of resources and competencies placed at the basis of their competitive advantage; and iii) redesign corporate governance through the definition of organizational positions that have primary responsibility for sustainability. The comparative strategic study of global and local BFs revealed that the two observed groups pursue similar strategies in the areas of environmental sustainability and ethics. They differ, however, in their choices of social sustainability and transparency. Local BFs show a lower degree of integration of strategic objectives with those of a sustainable nature than global BFs, placing themselves at an early stage (legitimation phase) of evolution towards sustainability. This is confirmed by both the low degree of stakeholder engagement in strategic planning processes and the absence of organizational changes in this direction. Despite this, the

influence of the strategic orientations pursued by global BFs and the strategic contribution of the global biotech industry to SD promote the spread of an innovative corporate culture that connects patients, suppliers, customers, distributors, competitors, investors, governmental organizations, local communities and research partners with each other. All this at the local level translates into positive impacts that create value in terms of growth of the business structure, development and enhancement of the welfare of local communities.

References

Achard, P. O. (2019). Strategic Management of Public–Private Partnerships: Actors, Aims, and Capabilities. In R. M. Clark and S. Hakim (Eds.), *Public Private Partnerships: Construction, Protection, and Rehabilitation of Critical Infrastructure*, pp. 261-280. Springer, Cham. https://doi.org/10.1007/978-3-030-24600-6_13

Achard, P. O., & Bellini, C. (2023). Value creation processes in the European Biotech Industry: the role of collaboration strategies. Selected Papers from the ERAZ Conference (pp. 63-72). Association of Economists and Managers of the Balkans. https://doi.org/10.31410/ERAZ.S.P.2023.63

Awa, H. O., Etim, W., & Ogbonda, E. (2024). Stakeholders, stakeholder theory and Corporate Social Responsibility (CSR). *International Journal of Corporate Social Responsibility*, *9*(1), 11. https://doi.org/10.1186/s40991-024-00094-y

Baumgartner, R. J. (2014). Managing corporate sustainability and CSR: A conceptual framework combining values, strategies and instruments contributing to sustainable development. *Corporate Social Responsibility and Environmental Management*, *21*(5), 258-271. https://doi.org/10.1002/csr.1336

Bhattacharya, C. B., Sen, S., Edinger-Schons, L. M., & Neureiter, M. (2023). Corporate purpose and employee sustainability behaviors. *Journal of Business Ethics*, *183*(4), 963-981. https://doi.org/10.1007/s10551-022-05090-5

Bloem, V., & Salimi, N. (2023). Role of knowledge management processes within different stages of technological innovation: evidence from biotechnology SMEs. *Knowledge Management Research & Practice*, *21*(4), 822-836. https://doi.org/10.1080/14778238.2022.2064352

Burik, A. (2024, March 18). *More sustainable drug development and lab sustainability*. Labiotech. https://www.labiotech.eu/partner/sustainable-drug-discovery-and-development/

Caroli, M. (2021). *Economics and Sustainable Business Management*, Milano: McGraw Hill.

Carroll, A. B. (2021). Corporate social responsibility: Perspectives on the CSR construct's development and future. *Business & Society*, *60*(6), 1258-1278. https://doi.org/10.1177/00076503211001765

Chandler, D. (2022). *Strategic corporate social responsibility: Sustainable value creation*. Sage Publications.

Colvin, R. M., Witt, G. B., & Lacey, J. (2020). Power, perspective, and privilege: the challenge of translating stakeholder theory from business management to environmental and natural resource management. *Journal of Environmental Management*, *271*, 110974. https://doi.org/10.1016/j.jenvman.2020.110974

Doz, Y. L. (2023). In Search of Metanationals. INSEAD Working Paper, 2023/14/STR. https://dx.doi.org/10.2139/ssrn.4417190

Etit, D., Meramo, S., Ögmundarson, Ó., Jensen, M. K., & Sukumara, S. (2024). Can biotechnology lead the way toward a sustainable pharmaceutical industry?. *Current Opinion in Biotechnology*, *87*, 103100. https://doi.org/10.1016/j.copbio.2024.103100

Freeman, R. E. (2023). Managing for Stakeholders: Trade-Offs or Value Creation. Issues in Business Ethics, 295-299. https://doi.org/10.1007/978-3-031-04564-6_15

George, G., Haas, M. R., McGahan, A. M., Schillebeeckx, S. J., & Tracey, P. (2023). Purpose in the for-profit *firm*: A review and framework for management research. *Journal of Management*, *49*(6), 1841-1869. https://doi.org/10.1177/01492063211006450

González-Ramos, M. I., Guadamillas, F., & Donate, M. J. (2023). The relationship between knowledge management strategies and corporate social responsibility: Effects on innovation capabilities. *Technological Forecasting and Social Change*, *188*, 122287. https://doi.org/10.1016/j.techfore.2022.122287

International Council of Biotechnology Association (ICBA). (2024, August 29). *Biotechnology is Driving Solutions for Sustainable Development.* ICBA. https://internationalbiotech.org/biotechnology/biotech-sdgs/

Iseppi, L., & Rosa, F. (2022). *Economics and business of biotechnology from rDNA to NGS.* Padova University Press: Italy.

Kantabutra, S., & Ketprapakorn, N. (2020). Toward a theory of corporate sustainability: A theoretical integration and exploration. *Journal of Cleaner Production*, *270*, 122292. https://doi.org/10.1016/j.jclepro.2020.122292

Latapí Agudelo, M. A., Jóhannsdóttir, L., & Davídsdóttir, B. (2019). A literature review of the history and evolution of corporate social responsibility. *International journal of corporate social responsibility*, *4*(1), 1-23. https://doi.org/10.1186/s40991-018-0039-y

Lin, M., & Lekhawipat, W. (2023). Key influencing factors for the success of external innovation strategies in the biotechnology industry. *Journal of Business & Industrial Marketing*, *38(12)*, 2745-2759. https://doi.org/10.1108/JBIM-07-2022-0307

Lokko, Y., Heijde, M., Schebesta, K., Scholtès, P., Van Montagu, M., & Giacca, M. (2018). Biotechnology and the bioeconomy—Towards inclusive and sustainable industrial development. *New biotechnology*, *40*, 5-10. https://doi.org/10.1016/j.nbt.2017.06.005

López-Concepción, A., Gil-Lacruz, A. I., & Saz-Gil, I. (2022). Stakeholder engagement, CSR development and SDGs compliance: A systematic review from 2015 to 2021. *Corporate Social Responsibility and Environmental Management*, *29*(1), 19-31. https://doi.org/10.1002/csr.2170

Mai, N. K., Nguyen, A. K. T., & Nguyen, T. T. (2021). Implementation of corporate social responsibility strategy to enhance firm reputation and competitive advantage. *Journal of Competitiveness*, *13*(4), 96-114. https://doi.org/10.7441/joc.2021.04.06

Marakova, V., Wolak-Tuzimek, A., & Tučková, Z. (2021). Corporate social responsibility as a source of competitive advantage in large enterprises. *Journal of Competitiveness*, *13*(1), 113-128. https://doi.org/10.7441/joc.2021.01.07

Matten, D., & Moon, J. (2020). Reflections on the 2018 decade award: The meaning and dynamics of corporate social responsibility. *Academy of Management Review*, *45*(1), 7-28. https://doi.org/10.5465/amr.2019.0348

Menghwar, P. S., & Daood, A. (2021). Creating shared value: A systematic review, synthesis and integrative perspective. *International Journal of Management Reviews*, *23*(4), 466-485. https://doi.org/10.1111/ijmr.12252

Mio, C., Panfilo, S., & Blundo, B. (2020). Sustainable development goals and the strategic role of business: A systematic literature review. *Business strategy and the environment*, *29*(8), 3220-3245. https://doi.org/10.1002/bse.2568

Nguyen, H. L., & Kanbach, D. K. (2024). Toward a view of integrating corporate sustainability into strategy: A systematic literature review. *Corporate Social Responsibility and Environmental Management*, *31*(2), 962-976. https://doi.org/10.1002/csr.2611

Porter, M. E., & Kramer, M. R. (2018). Creating shared value: How to reinvent capitalism—And unleash a wave of innovation and growth. In: Lenssen, G. G., Smith, N. C. (Eds.) Managing Sustainable Business (pp. 323-346). Springer, Dordrecht. https://doi.org/10.1007/978-94-024-1144-7_16

Risi, D., Vigneau, L., Bohn, S., & Wickert, C. (2023). Institutional theory-based research on corporate social responsibility: Bringing values back in. *International Journal of Management Reviews*, *25*(1), 3-23. https://doi.org/10.1111/ijmr.12299

Stahl, G. K., Brewster, C. J., Collings, D. G., & Hajro, A. (2020). Enhancing the role of human resource management in corporate sustainability and social responsibility: A multi-stakeholder, multidimensional approach to HRM. *Human resource management review*, *30*(3), 100708. https://doi.org/10.1016/j.hrmr.2019.100708

Statista. (2024, August 29). *Select top global biotechnology companies based on market capitalization as of 2023.* Statista. https://www.statista.com/statistics/262708/top-biotech-companies-based-on-revenue/

Stocker, F., de Arruda, M. P., de Mascena, K. M., & Boaventura, J. M. (2020). Stakeholder engagement in sustainability reporting: A classification model. *Corporate Social Responsibility and Environmental Management*, *27*(5), 2071-2080. https://doi.org/10.1002/csr.1947

Tsalis, T. A., Malamateniou, K. E., Koulouriotis, D., & Nikolaou, I. E. (2020). New challenges for corporate sustainability reporting: United Nations' 2030 Agenda for sustainable development and the sustainable development goals. Corporate Social Responsibility and Environmental Management, 27(4), 1617-1629. https://doi.org/10.1002/csr.1910

Velte, P. (2022). Meta-analyses on corporate social responsibility (CSR): a literature review. *Management Review Quarterly*, *72*(3), 627-675. https://doi.org/10.1007/s11301-021-00211-2

Verdecho, M. J., Alarcón-Valero, F., Pérez-Perales, D., Alfaro-Saiz, J. J., & Rodríguez-Rodríguez, R. (2021). A methodology to select suppliers to increase sustainability within supply chains. *Central European Journal of Operations Research*, *29*, 1231-1251. https://doi.org/10.1007/s10100-019-00668-3

Vishwanathan, P., van Oosterhout, H., Heugens, P. P., Duran, P., & Van Essen, M. (2020). Strategic CSR: A concept building meta-analysis. *Journal of Management Studies*, *57*(2), 314-350. https://doi.org/10.1111/joms.12514

Voegtlin, C., & Scherer, A. G. (2017). Responsible innovation and the innovation of responsibility: Governing sustainable development in a globalized world. *Journal of Business Ethics*, *143*, 227-243. https://doi.org/10.1007/s10551-015-2769-z

Wæraas, A. (2020). Organizational Identity and Corporate Social Responsibility (CSR) Legitimation. In: Rendtorff, J. D. (Eds.) Handbook of Business Legitimacy (pp. 1059-1078). Springer, Cham. https://doi.org/10.1007/978-3-030-14622-1_78