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SUSTAINABILITY AND BUSINESS PERFORMANCE BUILDING RESILIENCE WITH GRI PRACTICES

To what extent do sustainability initiatives adopted by companies, in compliance with the Global Reporting Initiative (GRI), promote economic resilience? This study analyzes and compares the resilience of SMEs and large companies in Italy, examining the relationships between sustainability indicators according to the GRI taxonomy and the relative economic resilience performance of these organizations, measured by turnover. The results show that although large companies generally perform better than SMEs in all dimensions of sustainability, both categories follow similar approaches in implementing GRI practices, ensuring marked improvement in economic resilience.

RESILIENCE//GRI STANDARDS//SUSTAINABILITY//VALUE CHAIN//GLOBAL REPORTING INITIATIVES (GRI)



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Despite the growing attention of policymakers, companies, and society focused on the issues of resilience and sustainability, research on the synergies between these two concepts is still limited (Negri et al., 2021). Some studies suggest that sustainability can enhance corporate resilience by facilitating adaptation to changing circumstances, thereby reducing the negative impact of disruptions (Maleki Vishkaei and De Giovanni, 2024). However, other research suggests that there is no direct correlation between sustainability and resilience, as the latter is more closely related to business operations than sustainability, which is more complex in nature (Júnior et al., 2023). These mixed results underscore the need for a more in-depth analysis to identify the mutual relationships and potential synergies

between the two concepts, paving the way for companies to develop in both directions.

In light of this, the purpose of our study is to examine the relationship between the adoption of Global Reporting Initiative (GRI) recommendations and factors that influence resilience. Although several taxonomies exist to support sustainability reporting, we chose to use the GRI standards because of their proven effectiveness in measuring and communicating impact on critical sustainability issues such as climate change, human rights, governance, and social welfare. Developed with input from a wide range of stakeholders, including companies, civil society, labor unions, and academic institutions, the GRI Standards are applicable to organizations of all sizes, sectors, and locations, and provide a comprehensive overview of material issues that are relevant to companies.

To assess the effectiveness of a company's economic resilience, our study focuses on the interactions between the economic, social and environmental dimensions of the GRI taxonomy and the resilience levers outlined by the Resilience Consortium of the World Economic Forum (WEF). These levers, identified through a rigorous research protocol, are quantified through accurate estimates of their impact on global economic growth.

GRI STANDARDS

To analyze the link between resilience and sustainability, we identified a set of GRI standards for examining the social, economic, and governance sustainability of companies. Specifically, to measure social sustainability, we focused on the following indicators: employment, labor management, occupational health and safety, training and education, diversity and equal opportunity, non-discrimination, freedom of association and collective bargaining, child labor, forced or compulsory labor, security practices, indigenous peoples' rights, human rights compliance assessment, local communities, supplier social

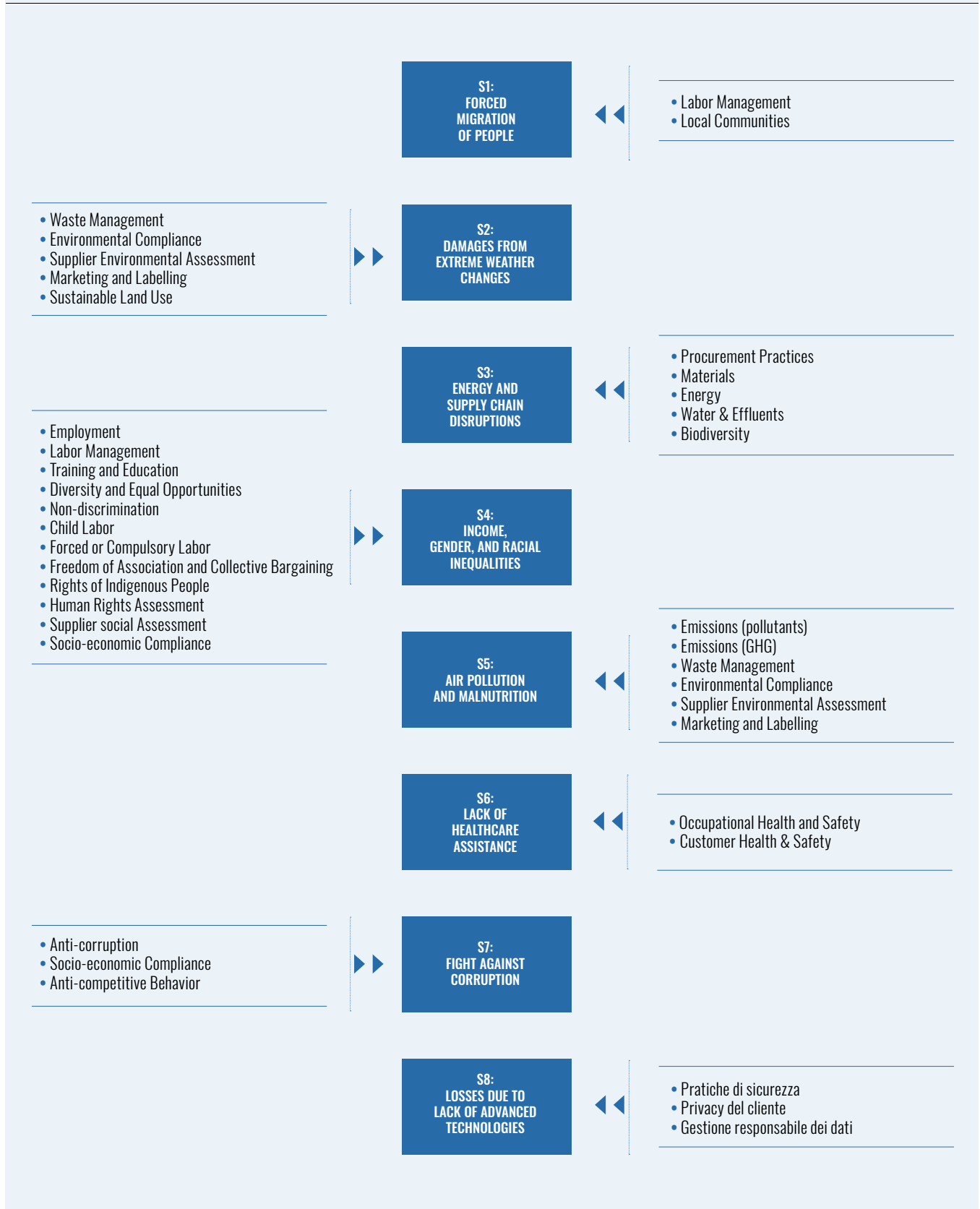
practices assessment, customer health and safety, marketing and labeling, customer privacy, and socioeconomic compliance. For environmental sustainability standards, we concentrated on: materials, energy, water and wastewater, biodiversity, emissions (pollutants), emissions (GHGs), waste management, environmental compliance, and supplier environmental assessment. Finally, our dataset includes four dimensions of economic sustainability and governance: procurement practices, anti-corruption, anti-competitive behavior, and taxation

METHODOLOGY

Our study is based on a dataset of interviews with 172 Italian SMEs, which provided input on how they adopted GRI standards and implemented sustainability practices. Similarly, we collected information on 100 large companies by reviewing financial statements and sustainability reports published on official websites. The final dataset provides valuable information on sustainability practices and initiatives and allows us to analyze and map the ESG strategies of Italian companies. The sample includes several sectors: manufacturing (36%), agribusiness (19%), ICT (17%), engineering (13%), healthcare (7%), services (5%) and other sectors (3%).

To analyze the synergies between sustainability practices and economic resilience, our study uses the framework introduced by the WEF, which assigns each resilience lever a percentage score between one and five to estimate its impact on GDP growth. After normalizing the impact rates of the eight resilience factors we selected (which we will explain in the next section), we assigned their final weights to come up with a sum of 100%. We then calculated the economic resilience score using the average adoption rates of the GRI standards by companies and the normalized weights of the eight resilience levers. We applied our methodology to different sectors, which allowed us to compare SMEs and large companies.

FIGURE 1. THE IMPACT OF SOCIAL AND ENVIRONMENTAL SUSTAINABILITY ON THE ECONOMIC RESILIENCE OF ITALIAN COMPANIES



THE MAIN LEVERS OF RESILIENCE

Applying the model proposed by the WEF to our dataset, the results indicate that while all GRI standards are generally relevant to the economic resilience of companies, the greatest impact is exerted by the following resilience factors: (S1) forced relocation of people; (S2) damage from extreme climate change; (S3) energy and supply chain disruption; (S4) income, gender, and racial inequality; (S5) air pollution and malnutrition; (S6) lack of health care; (S7) fighting corruption; and (S8) losses due to lack of advanced technology. These impact drivers are divided into various subcategories related to the GRI standards, detailed in Figure 1.

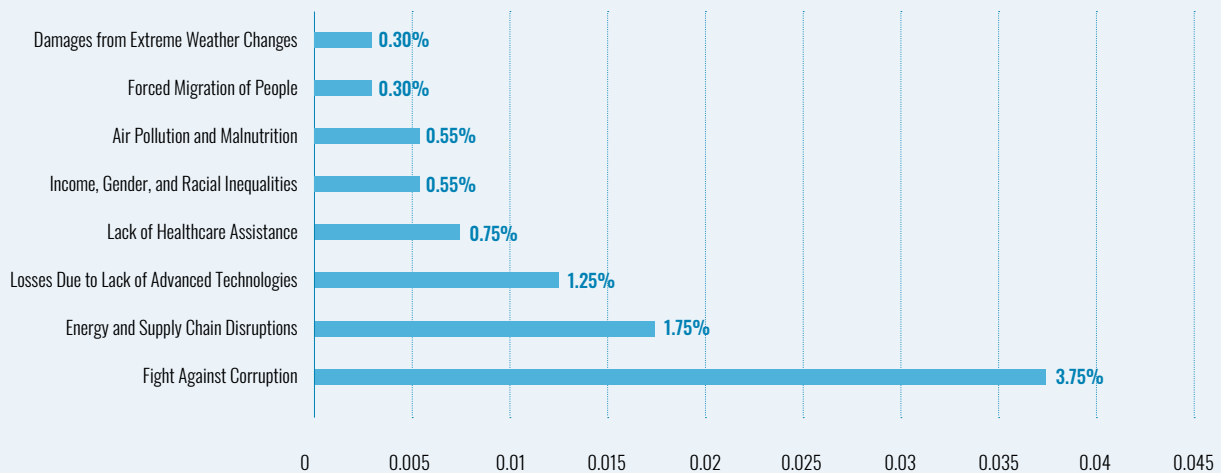
Figure 2 shows the average impact of each resilience factor on GDP growth. Corruption emerges as having the highest percentage impact, demonstrating its ability to dramatically undermine the economic stability of businesses due to additional costs, loss of reputation, and legal risks. Disruptions to the supply chain and energy sources, especially renewable energy sources, can be detrimental to business continuity, underscoring the importance of developing contingency plans and diversifying energy

sources, especially in energy-intensive sectors. Major fallout from losses due to a lack of advanced technologies is also highlighted, underscoring the need to invest in innovation and digitization to maintain international competitiveness and achieve the sustainability goals of the 2030 Agenda, including decarbonization plans.

In terms of social sustainability, a lack of healthcare can reduce employee productivity and increase costs related to absenteeism and medical care. To mitigate these impacts, companies must implement policies that target the health and well-being of employees, ensure adequate access to care, and promote health. Income, gender, and race inequalities are an additional concern, as they can undermine social cohesion and create tensions inside and outside the company, fueling a climate of tension and conflict. Although companies today are more likely to activate inclusive policies and take concrete actions to promote equity and diversity, practices and behaviors that perpetuate inequality persist, requiring effective cultural change management.

Our findings reveal additional factors affecting social sustainability, such as air pollution and malnutrition, which can lead to increased health care costs and negative environmental impacts,

FIGURE 2. THE AVERAGE IMPACT OF THE RESILIENCE FACTORS ON THE GDP (%)



underscoring the need to rethink corporate social responsibility and environmental sustainability from a holistic perspective. Finally, although relatively low in percentage terms, forced displacement and damage resulting from extreme climate change cannot be overlooked, as they can pose new and unforeseen risks and as such affect the long-term economic resilience of companies.

COMPARISON BETWEEN LARGE COMPANIES AND SMEs

Overall, the results shown in Figure 3 indicate that large companies have superior turnover resilience performance across all drivers analyzed, with an aggregate score that is almost double that of SMEs.

S1. Forced displacement of people

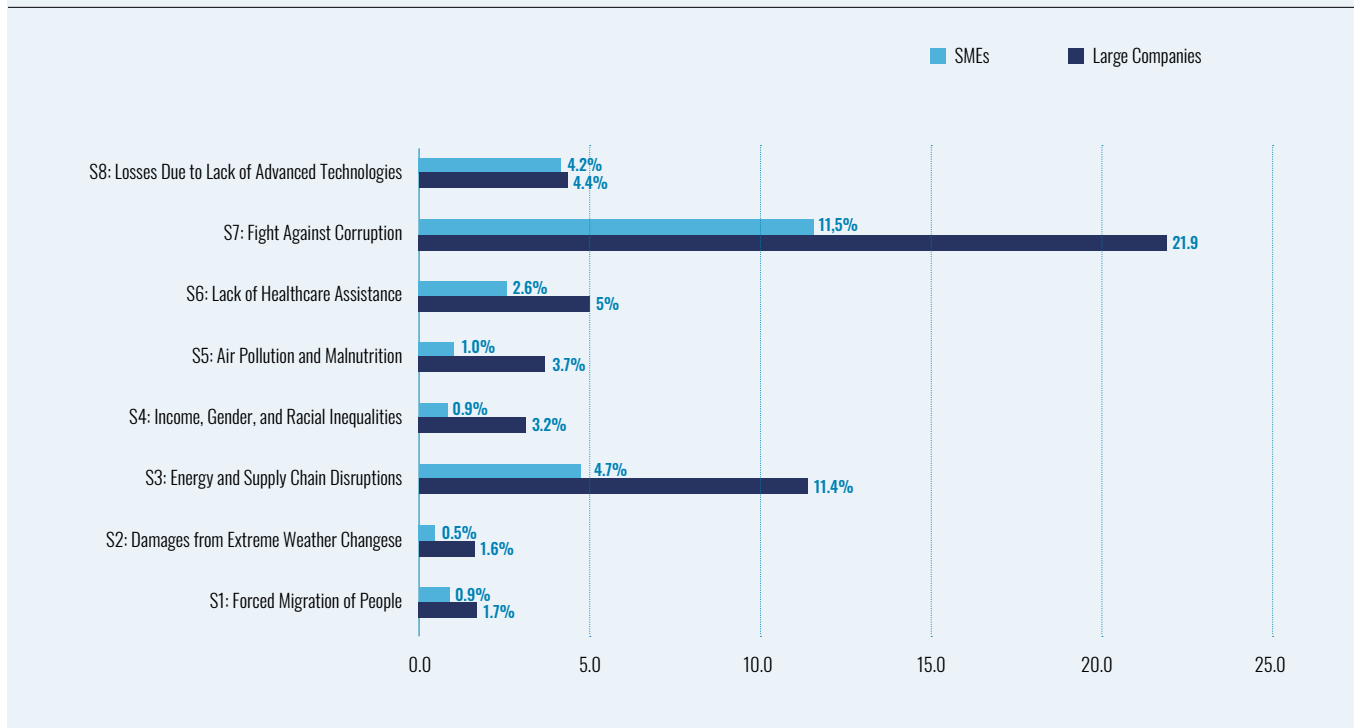
Driver S1 relates to the forced displacement of people through coercion and violence and involves a range of challenges in the destination country,

from direct issues such as access to employment, family reunification, and education, to indirect issues such as conflict, persecution, and natural disasters.

Together, these dynamics can significantly affect the balance between labor supply and demand. Our results (Figure 3) show a weak correlation in large firms and SMEs between this driver and economic resilience in terms of revenue recovery after a disruption. Specifically, large companies have a resilience score of 1.7 compared to 0.9 for SMEs, representing a gap of 47.05%. This gap can be attributed to the greater availability of jobs and bigger investments by large companies in business and workforce diversification. Indeed, the ability to attract fresh talent and new professionals strengthens the adaptability to weather changes and crises.

In contrast, SMEs are often constrained by limited resources, both human and financial, which makes it more difficult to respond effectively to external shocks. If these are not adequately addressed, they can result in the

FIGURE 3. COMPARISON OF RESILIENCE SCORE BETWEEN LARGE COMPANIES AND SMEs



migration of employees to other locations or countries, further reducing the ability of SMEs to improve revenue resilience. This difference in economic resilience performance underscores the importance of supporting SMEs in times of crisis and in the face of global challenges, to reduce skills leakage and in doing so preserve Made in Italy know-how and the workforce.

S2. Damage from extreme weather events

Driver S2 covers key business sustainability indicators such as waste management, environmental compliance, supplier environmental assessment, marketing, labeling, and sustainable land use. This driver has a sizeable impact on the economic resilience of companies. Extreme weather events are difficult to predict and cope with. As such, they can upend the entire supply chain, causing disruptions in raw material procurement, distribution logistics, and personnel mobility, and potentially even temporarily shut down production activities. Therefore, it is essential that companies take preventive measures and develop contingency plans to adequately contend with these challenges and minimize negative consequences.

Our results show a resilience score of 1.6 for large companies compared to 0.5 for SMEs on a scale of 0 to 3.3. This gap reflects ample room for improvement for both categories. The variation in scores can be attributed not only to the different financial capacities required to implement and manage effective resilience and contingency plans, but also to the obligations imposed by sustainability certifications and current regulations. Indeed, large companies are often involved in international tenders, which means they are required to adhere to strict sustainability principles, particularly in selecting and managing their suppliers. Given the extensive global presence of large companies, these two processes affect the supply chain at different levels and in different countries, prompting them to invest in innovative technologies and targeted operational practices to monitor supplier activities, reduce

environmental impacts, and improve resilience to climate crises. In addition, their greater international exposure subjects them to more intense public and regulatory scrutiny, pushing them to maintain high standards of sustainability to protect their reputations and comply with market expectations and applicable regulations. These dynamics explain the gap in economic resilience performance between large companies and SMEs.

S3. Energy and supply chain disruptions

The S3 driver relates to sourcing practices, purchased materials, energy sources, water use, waste management, and biodiversity. In a global context where supply chains need to ensure a sustainable flow of resources such as energy, oil, and gas, the relationships between the various actors are closely interlinked and vulnerable to international crises and conflicts. The lack of appropriate strategies, such as source diversification, flexible contracts, careful planning of transportation capacity, and adequate safety stocks, can exacerbate the risks of disruption and reduce the ability of companies to maintain economic resilience.

The results of our analysis show a resilience score of 11.4 for large companies, while SMEs score 4.7. (The maximum is 19.) This 59% gap highlights the appreciable differences in disruption management capabilities between the two groups. Large companies, with greater availability of resources and access to advanced technologies, can implement more robust and sophisticated strategies that provide higher levels of economic resilience. These strategies include investments in green technologies, increased collaboration with strategic suppliers, and the adoption of sustainable practices that not only mitigate risk but also improve operational efficiency.

In contrast, SMEs with fewer resources and limited access to technology often find themselves negotiating less favorable terms and struggling to adapt quickly to changing market dynamics and regulatory pressures. Their ability to respond

can be further compromised by the lack of effective resilience plans, which are critical to managing disruptions without suffering severe consequences. But such plans require substantial investments of economic resources.

S4. Income, gender, and racial inequalities

Driver S4 covers employment, labor relations, training and education, diversity and equal opportunity, non-discrimination, child labor, and human rights. Managing these indicators has become increasingly complex for companies large and small due to the multifaceted nature of these issues. For example, gender inequalities (such as women earning less than men on average) result from a combination of cultural, social and economic factors. Similarly, racial inequalities are not limited to the wage gap, but also manifest themselves in access to education, employment opportunities, and exposure to poverty risks for affected communities.

Large companies and SMEs have made sizeable investments in recent years to address inequality and generate benefits for communities and the global economy. However, data analysis shows a 72% gap between large companies and SMEs (which scored 3.2 and 0.9, respectively). This difference can be attributed to the ability of the former to implement more effective strategies to address critical issues related to the S4 driver. With their global presence and greater availability of financial resources, large companies can implement effective policies to promote equality and diversity in the workplace and monitor implementation throughout the supply chain. These efforts result in training programs that raise awareness of gender and race issues, inclusive career plans that promote the representation of women and minorities in management roles, and hiring practices that overcome unconscious bias, facilitating the discovery of new talent. In contrast, SMEs face greater challenges in implementing meaningful change due to their small size, limited resources and reduced bargaining power, especially in global supply chains.

Engaging in the fight against inequality is not only ethically imperative; it also boosts productivity by broadening the base of resources and expertise available to the company. It is therefore vital that SMEs are given incentives and support to improve their ability to manage diversity effectively, reducing the resilience gap with larger companies and improving economic competitiveness.

S5. Air pollution and malnutrition

This driver analyzes the impact of two critical global issues: emissions of pollutants and greenhouse gases into the environment and the impact of food shortages on public health. Specifically, this driver covers the following GRI topics: pollutant and greenhouse gas emissions, waste management, environmental compliance, and labeling marketing practices.

Air pollution resulting from toxins and greenhouse gases, is responsible for many deaths in G7 countries and negatively affects public health and the environment, leading to increased healthcare costs and reduced agricultural productivity. By the same token, malnutrition is a direct consequence of limited food availability and is exacerbated by population growth and climate change, which threaten food production.

Larger companies tend to have greater environmental impacts due to their large-scale industrial operations and long supply chains. However, they often offset these impacts through investments in clean technology and corporate social responsibility initiatives, including nutrition programs and support for local communities. Data from our analysis shows that large companies have a resilience score of 3.7, indicating greater awareness and ability to cope with impacts than SMEs with a score of 1.0. This 73% percent gap can be attributed to the ability of big players to implement advanced strategies and integrate higher standards of sustainability into their operations, such as adopting sustainable sourcing practices, investing in emission reduction technologies, and nutrition awareness

initiatives. In addition, large companies actively participate in international tenders that set strict sustainability criteria in evaluating suppliers, a practice that SMEs find difficult to implement due to their limited organizational and financial capacities.

S6. Inadequate healthcare

This driver analyzes the ability of companies to ensure access to healthcare services for employees and guarantee safety for customers. It includes GRI indicators such as occupational health and safety, and customer health and safety, which can also be addressed through effective marketing and labeling policies.

Inadequate healthcare poses a serious risk to the well-being of employees and consumers and has a direct impact on a company's productivity and reputation. In the event of a disruption here, the lack of adequate healthcare measures can significantly undermine the economic resilience of companies, given the strong link to the social sphere. Our analysis finds an economic resilience score of 5.0 for large companies compared to 2.6 for SMEs, a 48% difference that can be explained by the former's ability to offer comprehensive health insurance programs and benefits that go beyond the minimum legal guarantees, including access to preventive care and wellness and psychological support. These programs not only improve the overall health of employees, reducing sick days and increasing productivity, but also contribute to greater resilience thanks to employee availability and on-call time, minimizing strikes and absenteeism. In addition, large companies are more likely to strictly adhere to customer health and safety regulations and to invest in marketing campaigns that promote health awareness, thereby building brand equity and consumer trust. In contrast, SMEs struggle to offer advanced health and safety programs or initiatives due to tighter budgets, resulting in a shortfall compared to larger companies. This not only increases workplace risks, but also reduces the attractiveness of SMEs. Therefore, while large companies can leverage

their resources to create safer workplaces and a more trusted customer base through transparent communication and proactive investments in health and safety, SMEs may need external support or favorable public policies to fill these gaps and improve their economic resilience.

S7. Fighting corruption

This driver refers to GRI topics related to anti-corruption, socio-economic compliance, and anti-competitive behavior, which are important indicators for preventing the abuse of power. In fact, corruption is generally a major impediment to economic resilience, as it siphons off valuable resources and undermines confidence in the economy and business stability.

Our analysis shows an economic resilience score of 21.9 for large companies, while SMEs score 11.5. (The maximum score is 40.8.) These results highlight that while both categories need to strengthen their anti-corruption policies, large companies demonstrate greater economic resilience in this area.

The differences in anti-corruption strategies between large companies and SMEs are mainly due to available resources and organizational capabilities. Large companies are often forced to implement advanced control and compliance systems, monitoring systems, regular training programs for employees on ethics and compliance, and set up dedicated anti-corruption teams. While these initiatives help reduce corruption, they also require additional measures and expenditures to collect and analyze data along the supply chain through continuous auditing and tracking mechanisms. These systems are especially necessary for large companies that frequently participate in international tenders and global trade, where sustainability and anti-corruption criteria are stringent, detailed and vary from country to country.

This exposure requires large companies to maintain high standards of transparency and accountability, not only to comply with legal requirements, but also to enhance their public

image and build trust among stakeholders.

SMEs can also adopt anti-corruption strategies, albeit on a smaller scale, such as offering regular employee training, implementing clear zero-tolerance policies on corruption, and working with external entities to verify compliance. Given the gap with large companies, SMEs need external support and public policies that incentivize transparency and business ethics to improve their economic resilience.

S8. Losses due to lack of advanced technology

The S8 driver includes GRI topics such as security practices, customer privacy and responsible data management, and highlights how a lack of technology upgrades can affect the economic resilience of companies in the face of an increasingly digitized business environment and increasingly interconnected supply chain relationships.

The results of our study show relatively low economic resilience scores for both groups analyzed: 4.4 for large companies and 4.2 for SMEs. (The maximum score is 13.8.) The minimal difference in performance between the two groups (only 5%) suggests that the industrial sector as a whole faces formidable difficulties in adapting to technological change. This delay in adopting digital systems, a move which requires necessary

changes in business processes and routines, can have serious consequences for economic resilience. Technological obsolescence not only reduces production efficiency and increases energy consumption with consequent environmental impacts, but also affects business operations, causing frequent breakdowns, malfunctions or prolonged downtime.

To address emerging risks and increase economic resilience, it is critical for both large companies and SMEs to deploy a technological upgrade and digitization strategy. This includes investing in innovation and technology, research and development, partnering with technology companies and labs, or implementing state-of-the-art systems to integrate and automate global business processes and supply chains.

The minimal difference in resilience scores between large companies and SMEs indicates that all Italian companies today face daunting challenges in implementing new technologies, often due to rigid organizational structures, complex decision-making processes, and limited resources. To overcome these obstacles, companies must develop economic resilience plans that support sustainability indicators with by digitization, ensuring systematic certification of the real impact of sustainable practices, to avoid the risk of green washing.



REFERENCES

Bateman, A. H., Blanco, E. E., Gani, M. O., Yoshi, T., & Rahman, M. S. (2023). "Optimizing firm's supply chain resilience in data-driven business environment." *Journal of Global Operations and Strategic Sourcing*, 16(2), 258-281.

Júnior, L. C. R., Frederico, G. F., Costa, M. L. N. (2023). "Maturity and resilience in supply chains: a systematic review of the literature." *International Journal of Industrial Engineering and*

Operations Management, 5(1), 1-25. Maleki Vishkaei, B., De Giovanni, P. (2024). "Bayesian network methodology and machine learning approach: an application on the impact of digital technologies on logistics service quality." *International Journal of Physical Distribution and Logistics Management*, DOI [10.1108/IJPDLM-05-2023-0195](https://doi.org/10.1108/IJPDLM-05-2023-0195).

Negri, M., Cagno, E., Colicchia, C., & Sarkis, J. (2021). "Integrating

sustainability and resilience in the supply chain: A systematic literature review and a research agenda." *Business Strategy and the Environment*, 30(7), 2858-2886.

World Economic Forum (2022). "Resilience for Sustainable, Inclusive Growth," in collaboration with McKinsey & Company. White Paper, May 2022. www3.weforum.org.



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