

Table 11 Deep Science wave impacts in four fields

Life sciences and health	Agri-food
New scientific breakthroughs, treatments, and cures	New scientific breakthroughs
Genetics and stem cell research	New-generation sequencing
Nanotechnology	Bioreactor-based synthetic food production
Biologics	Lab-grown real meat and other future foods with higher yields and better nutrient content
Brain research	Self-fertilizing crops
New generation of vaccines and immunotherapy	Precision farming
Pain management	Smart fertilizers
Mental health treatments	Advanced packaging
New medical technologies (precision and regenerative medicine)	Total recycling
New health innovation systems	New food production systems
Novel approaches in health care research (e.g., AI)	Digital agriculture enabled by remote sensing, and geographic information systems
New ways of delivering health care (e.g., telemedicine)	Bio-controlled and artificial agro-ecosystems
	Vertical farming
	Innovation along the agri-food value chain, from seeds to farming and harvesting
	Digitalization of retail and logistics
Energy and clean technology	Mobility
New scientific breakthroughs	New scientific breakthroughs
Cheaper and efficient renewable energies	Electric batteries and other elements of energy and clean tech
Battery technologies	Autonomous vehicles
Fusion technology	Tunneling for high-speed transport
Geothermal	Supersonic and electric aviation
Green hydrogen	
Sustainable alternative fuels	New transport systems
Carbon dioxide catcher	Charging infrastructure
	Urban air mobility companies
New energy delivery and storage systems	Drone delivery
Digitalization of energy system	Ultra-highspeed train networks
Smart grid	Novel traffic management systems
Ultra-high voltage lines	
Utility-scale storage of renewable energy	
Small-scale renewable systems to provide electricity to people living far from the grid	

Sources: GII 2019, 2018, 2017 and this volume, in particular GII 2022 Expert Contribution from Gutierrez de Piñeres Luna.