



SDG-11: Sustainable Cities and Communities

13

Abstract

City governance is vital for sustainable development goals and resource management and allocation as well as urban climate-related initiatives, as it is estimated that more people will reside in the urban areas in further years. As more people migrate to cities, the world steadily becomes more urbanised. The population of the cities accounts for 55% of the total population, and cities generate 85% of global gross domestic product and emit 75% of greenhouse gas emissions. SDG-11, Sustainable Cities and Communities, aims to ensure inclusive, safe, resilient, sustainable urban and human settlements by providing inexpensive transit solutions, decreasing urban sprawl, enhancing urban governance involvement, improving the protection of cultural assets and addressing urban resilience and climate change issues. This chapter presents the business models of 50 companies and use cases that employ emerging technologies and create value in SDG-11. We should highlight that one use case can be related to more

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than one SDG and it can make use of multiple emerging technologies.

Keywords

Sustainable development goals · Business models · Sustainable cities and communities · Sustainability

City governance is vital for sustainable development goals and resource management and allocation as well as urban climate-related initiatives, as it is estimated that more people will reside in the urban areas in further years. As more people migrate to cities, the world steadily becomes more urbanised. The population of the cities accounts for 55% of the total population, and cities generate 85% of global gross domestic product (GDP) and emit 75% of greenhouse gas emissions. It is forecasted that by 2050, the total city population will be equal to 6.5 billion people. If the urban areas are going to be designed and managed as now, sustainable development will not be achieved. Additionally, due to the rising populations and migration, rapid urbanisation has resulted in a surge of populated cities, particularly in developing nations, and slums have

become a critical issue of urban life. The challenges of global sustainability cannot be solved without a significant focus on urban sustainability. Furthermore, making cities sustainable requires the establishment of jobs and economic opportunities, as well as safe and affordable housing, resilient communities and strong economies (UNDP 2020; Vaidya and Chatterji 2020). Further to that, there is a high potential of collaboration and coordination across various industries at the city scale, as well as the vital potential for policymakers in governments to recognise the interconnections and the need for interoperability among the stakeholders responsible for planning and designing sustainable development plans (Radovic 2019).

Perceiving the importance of cities, the United Nations General Assembly (UNGA) voted in 2015 to make “sustainable cities and communities” another target within the 2030 Agenda for Sustainable Development. Data obtained from 911 cities in 114 countries in 2020 shows that spatial urbanisation has been substantially quicker than population increase throughout the 1990–2019 period, and smaller cities are urbanising faster than larger cities (United Nations, 2021). In particular, from 2000 to 2018, the percentage of people living in slums fell from 39.66% to 29.25% among the global urban population. However, this percentile decrease is equivalent to an almost 80 million people increase (The World Bank 2021). This fact is a sign of the need for taking precautions to avoid devastating results.

“Sustainable Cities and Communities”, which is within the “Sustainable Development Goals of United Nations as Goal 11”, aims to “ensure inclusive, safe, resilient, sustainable urban and human settlements” by removing slum-like situations, providing inexpensive transit solutions, decreasing urban sprawl, enhancing urban governance involvement, improving the protection of cultural assets, addressing urban resilience and climate change issues, improving urban management (pollution and waste management), ensuring access for all to secure public places and enhancing urban management through improved urban rules and regulations (Franco et al. 2020).

SDG-11 and prospective innovations and efficient solutions to enhance city policy coherence include several major sectoral interlinkages and urban synergies. Despite the worldwide progress to lead and drive all processes on sustainable development, there are still significant information gaps and difficulties that might stymie SDG-11 implementation. The New Urban Agenda of UN-Habitat presented by “The United Nations Human Settlements Programme” emphasises the importance of a concentrated emphasis at the city and neighbourhood levels. It also has direct, tangible benefits for people’s quality of life and the achievement of long-term developmental goals. To provide successful implementation and make concrete improvements in people’s daily lives, the global goals laid forth in SDG-11 must be integrated with local development agendas (Franco et al. 2020). As shown in Fig. 13.1, there are ten targets within the context of SDG-11.

SDG-11 and the subject of sustainable urbanisation are important for most countries, given the high rates of urbanisation and the expected future share of the urban population (Koch and Krellenberg 2018). For instance, nearly three-quarters (320 million people) of the European Union’s (EU) population reside in urban regions such as cities, towns and suburbs. Europe’s urban population is predicted to rise to just over 80% by 2050. As a result, sustainable cities, towns and suburbs are vital for their residents’ well-being and quality of life (Eurostat 2021). Another critical fact that should be stated is, while occupying only 3% of the Earth’s territory, cities account for 60–80% of global energy consumption and 75% of global carbon emissions (United Nations 2021). Thus, the results of related regulations in the cities could impact the entire earth.

When creating sustainable smart cities that focus on SDG-11, several factors are to consider. The growth of information communication technologies (ICT) has significantly influenced the way people live their lives and how they arrange work, leisure and society. A variety of innovative products, services and business models have been facilitated by a drop-in computer capacity costs and size. Two significant developments could be stated for the



Fig. 13.1 SDG-11 targets. (United Nations, 2021)

worldwide growth of ICT and to make cities smart. The first is the transition from cables to wireless services, including telephones and the Internet. The second trend is related to the rising number of devices linked to the Internet and the

change to the “Internet of Things” (Townsend, cited in Höjer and Wangel 2015). Furthermore, the impact of smart cities on sustainability cannot be underestimated. Renewable and green energy, energy efficiency, air quality, environ-

ment monitoring and water quality monitoring are all noteworthy research subjects in smart city planning (Ismagilova et al. 2019):

Renewable Energy Many key city entities, such as wireless sensor networks and water distribution, require power systems for basic operation. These have to be adapted into being optimised, intelligent and environmentally friendly in the smart city concept. This is possible with renewable energy and ICT systems. The main targets of smart cities are reducing energy usage, providing renewable energy and lessening the carbon footprint. All of this leads to the smart city energy concept (Aamir et al. 2014; Ismagilova et al. 2019).

Energy Efficiency The concept of energy efficiency enables maximum productivity with less energy consumption. Experts give several ideas to achieve this goal. For instance, a new technique that helps prevent energy efficiency anomalies in smart buildings was presented (Peña et al. 2016). The suggested method is built on a rule-based system that uses data mining tools and energy efficiency specialists' expertise. This research has resulted in a series of rules that may be used as part of a decision support system to optimise power consumption and anomalies in intelligent buildings by monitoring device activation and minimising power consumption while considering varied user needs (Peña et al. 2016).

Environmental Monitoring Another important focus is environmental monitoring. For example, six different environmental factors are identified for "Smart City Mission" in India: landscape and geography, climate, atmospheric pollution, water resources, energy resources and urban green areas. These factors should always be observed and accessible through online platforms to achieve public participation for problem-solving. This was achieved in Pisa, Italy, where the system gathered, processed and disseminated data

on air quality using a low-cost, distributed and efficient sensor network. Fixed and mobile sensor nodes were included in the system. Moreover, the data from the citizens were stored and later converted into indices such as Air Quality Index, Traffic Index, etc. All parties interested in obtaining regular updates on the city's air quality can access this information (Bacco et al. 2017; Dwivedi et al. 2019).

Air Quality Air pollution is one of the most serious concerns for industrialised societies. The World Health Organization (WHO) states that pollution is the prominent reason for mortality among children under the age of 5. A case study in the context of air quality monitoring was implemented in Christchurch, New Zealand, after the earthquake with a magnitude of 6.2. The research focused on near-real-time monitoring of fine-scale air pollution and connections to respiratory illnesses. The project's purpose was to create a citywide continuous real-time air pollution surface and provide the data in the form of an interactive dynamic map and raw data stream. A grid of four dust mote devices and low-cost IoT air quality sensors were used to collect the data. All people and interested parties were given access to data on air quality in a variety of formats, including main forms, maps and tables. Its goal was to encourage individuals to check air quality information simply and understandably. Also, citizens could collect information about their exposure (Marek et al. 2017). Identifying the city's most polluted and cleanest regions can help to enhance the environment and citizens' quality of life. Illnesses such as cerebral stroke can be minimised by reducing air pollution (Zaree and Honarvar 2018).

Water Quality Monitoring Managing the quality of water and providing safe drinking water are challenging in crowded cities. Nowadays, cities

confront difficulties such as ageing water infrastructure, high maintenance costs, new contaminants and increased water use as a result of the rising population. Therefore, an effective water management system is needed by sustainable cities (Hrudey et al. 2011; Hou et al. 2013; Polenghi-Gross et al. 2014). In particular, a study has been released that improved ICT may enhance drinking water quality throughout the world. In the study, wireless communication, data processing, storage and redistribution have been suggested for Bristol's quality monitoring system. Data collection, transfer, storage and visualisation are parts of the system which is based on cloud computing (Chen and Han 2018).

Cities will have to reconsider their systems and their environmental consequences as more people migrate into urban areas and environmental concerns become more urgent. Many cities across the world have already started to embrace more environmentally friendly practices (mostly in America and Europe), and certain patterns are emerging (Martin et al. 2018). Sustainable cities will build on these foundations, going beyond today's environmental standards. Cities have vital roles in sustainable development and are thus critical for both regional and global destinies. However, there is no one-size-fits-all solution for creating a sustainable city due to the climate, geography and law differences. Long-term planning is required for the most drastic changes aimed at creating a sustainable city, and future studies can lead to further discussions and decision-making processes. Future studies should focus on improving one's understanding of future opportunities for adapting to or avoiding future influences and consequences (Phdungsilp 2011).

Along with the developing sustainability industry, thanks to increasing investment ratios from companies around the world, many new business areas are emerging and will continue to

emerge in the future. Investing in SDG-11 can bring many benefits to the company. Companies may benefit from a better brand image, a greater staff retention rate and increased financial performance by investing in the sustainability of their communities. They will be able to keep up with changing laws and avoid penalties under their state's environmental legislation (Valuer | SDG 11 Forecast, p. 32).

Let's assume the appropriate policies are put in place. In that case, 24 million new jobs will be created by adopting sustainable energy practices and shifting to a greener economy, such as increasing electric vehicles usage and energy efficiency in existing and future buildings (International Labor Organization 2011). For instance, South Korea will invest USD 61 billion to raise renewable energy capacity from 12.7 GW to 42.7 GW by 2025 and increase its green mobility fleet to 1.33 million electric and hydrogen-powered vehicles. The plan will efficiently renovate public rental housing and schools to become more energy-efficient and transform urban areas into smart green cities (European Commission 2019). Moreover, the global electric vehicle market is estimated to reach 34,756 thousand units by 2030, up from an estimated 4093 thousand units in 2021 (Research and Markets 2021). Furthermore, a united effort to improve communities' sustainability will require investments in various sectors such as transport, waste management and construction (Valuer | SDG 11 Forecast, p. 32). Two sectors, which are indispensable for sustainable cities, will continue their development in the future; by 2023, the smart transportation industry will be worth \$149.2 billion (MarketsandMarkets 2020a, b), while the worldwide waste management market will be worth \$530 billion in 2025 (*Waste management market value worldwide 2027* 2020).

The built environment is one of the major causes of environmental degradation. Excessive

energy and resource consumption are caused by the embodied energy of the built environment during construction and the energy needs of structures during use (Wieser et al. 2019). The construction industry will be the most demanded market in the future. For instance, the global construction industry will be worth \$15 trillion by 2025 (Deloitte-Marketing & Brand Department 2021). Meanwhile, the global modular construction market is expected to reach \$157.19 billion by 2023, up from \$106.15 billion in 2017, with a CAGR of 6.9% (MarketsandMarkets 2020a, b). Additionally, the global construction sustainable materials market is expected to be worth \$523.7 billion by 2026 to provide a more environmentally friendly solution (BIS Research 2017). Well-managed cities will make efficient use of natural resources and technology, resulting in a beneficial and crucial impact on society, the environment and the economy (Revi and Rosenzweig 2013). By 2050, smart cities will have saved \$22 trillion through initiatives such as public transit and energy-efficient buildings (Smart City Futures 2017). Mobility as a service (MaaS) solutions are expected to increase in popularity as technological infrastructure improves, and data becomes more accessible worldwide. The global MaaS market will grow from \$38.76 billion to \$358.35 billion by 2025 (The Insight Partners 2018).

13.1 Companies and Use Cases

Table 13.1 presents the business models of 50 companies and use cases that employ emerging technologies and create value in SDG-11. We should highlight that one use case can be related

to more than one SDG and it can make use of multiple emerging technologies. In the left column, we present the company name, the origin country, related SDGs and emerging technologies that are included. The companies and use cases are listed alphabetically.¹

¹For reference, you may click on the hyperlinks on the company names or follow the websites here (Accessed Online – 2.1.2022):

<http://neer.ai/>; <http://www.fingerprints.com/>; <http://www.intel.com/>; <https://carge.co/>; <https://emsol.io/>; <https://enviosystems.com/>; <https://evreka.co/>; <https://nordsense.com/>; <https://numina.co/>; <https://phantom.ai/>; <https://restado.de/>; <https://skycatch.com/>; <https://ucomposites.com/>; <https://urbanfootprint.com/>; <https://view.com/>; <https://waymo.com/>; <https://www.actility.com/smart-building-facility-management/>; <https://www.altaeros.com/>; <https://www.betolar.com/>; <https://www.brighterbins.com/>; <https://www.cepton.com/>; <https://www.cyvision.com/>; <https://www.ekodenge.com/>; <https://www.five.ai/>; <https://www.foam.space/>; <https://www.fuelcellenergy.com/>; <https://www.gofar.co/>; <https://www.hayden.ai/>; <https://www.iberdrola.com/home/>; <https://www.interactions.com/>; <https://www.interstellarlab.com/>; <https://www.latitudo40.com/>; <https://www.oneclicklca.com/>; <https://www.optibus.com/>; <https://www.ourcrowd.com/>; <https://www.pirelli.com/global/en-ww/homepage/>; <https://www.printyour.city/>; <https://www.quantafuel.com/>; <https://www.sigfox.com/en/>; <https://www.skeletontech.com/>; <https://www.smartcultiva.com/>; <https://www.smartenspaces.com/>; <https://www.spacemakerai.com/>; <https://www.ubicquia.com/simply-connected-simply-smart/>; <https://www.urbansdk.com/>; <https://www.visionful.ai/>; <https://www.weride.ai/en/>; <https://zeleros.com/>

Table 13.1 Companies and use cases in SDG-11

| No | Company info | Value proposal (what?) | Value creation (how?) | Value capture |
|----|--|--|--|--|
| 1 | <p>Actility France 8, 9, 11 Autonomous vehicles, big data, Internet of Things</p> | <p>The company deploys unified, scalable, multipurpose IoT network infrastructure for utilities and cities, providing well-defined points of interoperability between systems.</p> | <p>By building a long-range low-power network for IoT, city authorities can connect countless battery-powered things into a single network, enabling data collection through parking sensors, environmental monitoring equipment or flood detection sensors. The data are then fed to centralised intelligent systems which can make recommendations to optimise city service management.</p> | <p>Value is produced by providing sustainable solutions that assist consumers in becoming more energy-efficient by reducing their energy consumption habit's environmental effect.</p> |
| 2 | <p>Altaeros USA 11 5G, AI, autonomous vehicles, Internet of Things</p> | <p>It is a firm that manufactures aerostats in a variety of sizes and with permanent or mobile bases to meet the demands of clients. These aerostats are intended to make network deployments for industrial IoT, rural connectivity and a variety of other data-intensive applications easier and faster.</p> | <p>“ST-Flex” aerostats offer mobile carriers and internet service providers (ISP) a way to provide service to rural and remote areas by enlarging coverage zone. ST-Flex expands customers’ 4G footprint with wide-area coverage from an aerial cell tower. It upgrades to 5G by swapping the payload equipment from the work platform on the ground. Also, this process completely covers a remote worksite with uninterrupted coverage, thanks to IoT.</p> | <p>Value creation is achieved by simplified deployments, shorter build-out times and less money required to keep the network up and running.</p> |
| 3 | <p>Betolar Finland 11, 13 Advanced materials</p> | <p>The company focuses on turning different industrial side streams from the energy, mining, steel and forestry industry into low-carbon, cement-free construction materials that perform the same as concrete in terms of qualities such as strength.</p> | <p>The company uses Advanced Materials named “Geoprime”: geopolymers-based low-carbon construction material and a sustainable alternative to cement. Its durability and strength are comparable to cement-based products.</p> | <p>They create sustainable building solutions in the construction sector by using advanced Materials and offering decreased carbon emissions. They produce cement-free and cost-effective materials.</p> |

(continued)

Table 13.1 (continued)

| No | Company info | Value proposal (what?) | Value creation (how?) | Value capture |
|----|--|--|--|---|
| 4 | <p>BrighterBins Belgium 11, 12 AI, Internet of Things</p> | <p>They develop complete sensor and route optimisation solutions for waste management and hauliers by using IoT and AI.</p> | <p>Their sensors collect data on fill levels and garbage disposal, which they communicate to the firm or a third-party IoT platform. The software optimises garbage collections and city planning using data from sensors and AI algorithms.</p> | <p>Revenue is generated by preventing overflowing bins, keeping communities clean and optimising trash pickup truck routes. Their sensors and IoT solutions improve traffic, reduce CO₂ emissions and make cities greener by using AI.</p> |
| 5 | <p>Charge Greece 7, 9, 11 Cloud computing</p> | <p>It is a cloud computing-based mobility as a service (MaaS) mobile application that allows electric vehicle drivers to connect to any public charging networks.</p> | <p>It includes thousands of charging stations across Europe and provides information on the closest charging points. Moreover, it helps users to reserve a place at the demanded charging point and gives them the fastest and safest route to the stations. They utilise smart algorithms to balance the grid directly with each vehicle utilising cloud computing.</p> | <p>Revenue is captured by energy savings. Users can maintain the battery life of their electric vehicles by no longer waiting at the charging stations.</p> |
| 6 | <p>Cepton Technologies USA 9, 11 Spatial computing</p> | <p>They develop lidar-based solutions for a variety of areas, including automotive (Advanced Driver Assistance Systems (ADAS)/AV (autonomous vehicle)), smart cities, smart spaces and smart industrial applications by using spatial computing.</p> | <p>They process the data that they collect via lidars by applying spatial computing. They provide intelligent and safe roads and rail, as well as pedestrian and traffic analytics, in the context of smart cities. Their Micro Motion Technology (MMT)-based lidar solutions can be used in a variety of intelligent sensing applications, such as ADAS, AV and smart infrastructure.</p> | <p>Their proprietary MMT-based lidars provide reliable, scalable and cost-effective solutions – thanks to spatial computing – for smart applications that require long-range, high-resolution 3D perception.</p> |
| 7 | <p>CY Vision USA 11 Spatial computing</p> | <p>The company is a 3D augmented reality head-up display manufacturer for future vehicles.</p> | <p>From broad sunshine to dark stormy situations, and with continuous depth from in-cabin to infinity, their AR head-up displays provide 3D capabilities with binocular disparity, full-motion parallax and focus blur cues.</p> | <p>Economic value is captured by bringing better vehicular experiences and providing safer rides by using augmented reality.</p> |

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| 8 | <p>Ekodenge Turkey 11 Big data, digital twins, Internet of Things</p> | <p>It is a company that specialises in digitalisation and sustainability, targeting buildings and industry. They have a project named “Ekobina+”, which is developed as an IoT-enabled, intelligent energy monitoring and management platform for public and private buildings.</p> <p>It is a cloud-based software-as-a-service (SaaS) platform that links to a network of vehicle tracking, air and noise pollution sensors to offer real-time monitoring and analytics by using IoT.</p> | <p>The platform can anticipate energy demand through energy simulations, thanks to an IoT-enabled database; it can also provide decision support for energy management through demand forecasting, cost optimisation and digital twin methodology, as well as calibrated energy simulation capability using live and historical IoT data.</p> <p>Air and noise pollution is measured every minute by using calibrated sensors, and retrieved data are processed with the help of cloud computing. By using IoT, exact sources of air and noise pollution are identified, thanks to their dashboards.</p> <p>Envio Systems creates cloud-based technology for commercial buildings that are already up and running. The primary IoT product suite is a complete end-to-end solution for any current commercial building, regardless of its size, age or infrastructure, that helps boost comfort and save energy costs while allowing you to monitor and manage your building from any web-enabled device.</p> | <p>Revenue is captured through the reduction of energy consumption, cost and emissions while improving indoor comfort and air quality conditions. Another benefit is the reduction of environmental and climatic impact by decreased consumption.</p> <p>Revenue is gained through the mitigation of air and noise pollution, especially for supply chain operations and construction activities by using their dashboards supported by cloud computing and IoT.</p> <p>A smart building system for existing commercial facilities that helps increase comfort and reduce energy cost while enabling you to monitor and manage your building from any web-enabled device.</p> |
| 9 | <p>EMSOL UK 11 Cloud computing, Internet of Things</p> | <p>The company develops smart building solutions for existing commercial buildings. Through IoT and cloud-based management, the system learns, predicts and optimises operations.</p> | <p>(continued)</p> | |
| 10 | <p>Envio Germany 11 Energy storage, Internet of Things</p> | <p>(continued)</p> | | |

Table 13.1 (continued)

| No | Company info | Value proposal (what?) | Value creation (how?) | Value capture |
|----|--|--|--|--|
| 11 | <p>Evreka Turkey 11 AI, Internet of Things</p> | <p>The waste management company offers software and hardware solutions to both public and private institutions. Evreka promotes smart and sustainable cities by optimising waste management processes across many industries. The company utilises sensors and machine-to-machine communication.</p> | <p>Evreka spans the entire waste process and delivers highly innovative technology and environmentally friendly solutions from the collecting phase through treatment and recycling with the seamless integration of cutting-edge equipment and unique software. Evreka uses AI and Machine Learning to digitise these procedures in order to save money and time and enhance efficiency while still ensuring citizen happiness.</p> | <p>Evreka is a SaaS company and makes profits by providing software and hardware solutions tailored to customers' needs. By providing efficient waste management solutions, Evreka saves local governments and private institutions' time and resources. Their efforts also result in environmental benefits. Efficient waste management processes divert more waste from landfills, reduce operational carbon emissions and mitigate health and safety risks.</p> |
| 12 | <p>Fingerprints Sweden 11 AI, biometrics, natural language processing</p> | <p>The company develops Distinct Area Detection (DAD) algorithm, which is a feature-based algorithm that looks for things that are unique in its surroundings within the touch platform.</p> | <p>The DAD algorithm works to locate distinct areas in the three-dimensional fingerprint image derived from the capacitive sensor. It consists of enrolment and verification/identification steps. Firstly, a number of distinct areas are extracted from the fingerprint image. The areas together with their geometric relationships form a template that is unique to each fingerprint. Secondly, the template is used as an operator acting on the fresh fingerprint image. If the match is approved, the authentication of the person is completed.</p> | <p>The values offered by the technology include efficient image quality, low power consumption, cost efficiency and biometric systems with features for a satisfying user experience with quick confirming a secure biometric payment.</p> |
| 13 | <p>Five AI UK 11 AI, autonomous vehicles</p> | <p>It is a platform that builds self-driving software components and development platforms to help autonomy programs solve the industry's challenges by using AI</p> | <p>They supply AI algorithms for creating/choosing different traffic situations, performing various simulations, analysing performances and enhancing the stack by applying machine learning. Their algorithms enable an Autonomous Driving System (ADS) to comprehend the environment around it by combining data from cameras, RADAR, LIDAR, IMU, GPS and other sensors.</p> | <p>Delivering sophisticated online components that answer the issues in self-driving systems and building a modular platform that enables performance and scale for system development and assurance utilising AI capture value.</p> |

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| 14 | <p>FOAM USA 11 Blockchain, Internet of Things</p> | <p>The company provides a permissionless and autonomous network of radios. It offers secure location services through time synchronisation, independent of centralised sources like GPS.</p> | <p>Thanks to blockchain, FOAM is transparent and censorship-resistant and can provide secure location data for other applications.</p> | <p>Social value is captured through secure and transparent location services, especially for cities.</p> |
| 15 | <p>FuelCell Energy USA 11 Carbon capture and storage, energy storage, hydrogen</p> | <p>The company provides solutions for power generation, carbon capture, local hydrogen production for transportation and industry and long-duration energy storage for utilities, industrial and large municipal power customers.</p> | <p>The company provides environmental solutions for various applications, including long-duration energy storage and fuel cell power plants. The energy storage system utilises solid oxide electrolysis cells to affordably and efficiently convert excess power into hydrogen, an energy carrier, for long-duration storage applications.</p> | <p>Revenue is captured through SureSource™ products, which deliver efficient, affordable and clean solutions to enable a world developed by clean energy. The SureSource product facilitates clean air permitting, reducing permitting costs and approval time.</p> |
| 16 | <p>GoFAR Australia 11 Internet of Things</p> | <p>The company registers business expenditure miles, analyses your car's health using IoT and measures driver performance.</p> | <p>The adapter plugs into the vehicle's diagnostic port and constantly monitors the car's health. Then it instantly alerts the driver about any problems it detects. Then, the car's data are sent from the adapter to the mobile app.</p> | <p>Value is created by reducing fuel consumption and increasing automobile operational lifetime. On average, it can save up to 9.8% fuel.</p> |
| 17 | <p>Hayden AI USA 11 AI, digital twins</p> | <p>It is a fully integrated urban mobility/traffic management platform that enhances road safety and traffic flow by utilising sources from AI and digital twin.</p> | <p>It uses AI-powered perception systems and a citizen app to turn public and private cars into street sensors, creating a real-time digital twin of the city by merging mobile sensors with citizen-driven data, and allows community and stakeholder involvement through easily accessible digital tools.</p> | <p>Economic and social value is captured through enabling safer and more sustainable cities by improving the traffic flow in terms of efficiency.</p> |

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Table 13.1 (continued)

| No | Company info | Value proposal (what?) | Value creation (how?) | Value capture |
|----|---|---|---|--|
| 18 | <p>Iberdrola Spain 7, 11, 13 Internet of Things</p> | <p>With the help of building automation systems, the company works on projects that focus on producing cost-cutting and energy-efficient solutions.</p> | <p>The company is implementing energy-saving measures in its facilities around the world to contribute to sustainability. In this implementation, IoT-based remote-controlled precautions are mostly used in lamps, electronic devices, etc. in the building.</p> | <p>Revenue is captured through informing and training users and providing sustainable solutions to help customers become more energy-efficient and reduce the environmental impact of their energy habits and consumption. Besides, they support women's and Paralympic sports to accelerate social development.</p> |
| 19 | <p>Imagine Intelligent Materials Finland 11 Advanced materials, Internet of Things</p> | <p>The company develops sensing solutions that deliver data from large surface areas in buildings, infrastructure and logistics and can be manufactured at scale.</p> | <p>Functionalised graphene transforms ordinary materials into electrically conductive, intelligent materials by using the Internet of Materials (IoM). These materials sense and report real-time changes in stress, temperature and moisture. In this process, signal processing expertise in hardware and software is combined in the nanotechnology sector.</p> | <p>The system provides real-time actionable insights on structural health, stress, pressure, leaks and fire detection. Its primary capabilities include asset monitoring of controlled surfaces and improving risk management, safety and productivity making the environment better and safer.</p> |
| 20 | <p>Interactions USA 11 AI, biometrics, natural language processing</p> | <p>It's a firm that makes intelligent virtual assistants, which mix AI and human understanding to help organisations and consumers have effective discussions.</p> | <p>Full-stack AI technologies with a unified technology suite enabling automatic speech recognition (ASR), natural language processing (NLP), dialog management and voice biometrics are included in the adaptable Platform. NLP offers the foundation for actionable intelligence applications and corporate processes by recognising the persons, places, subjects and intents present in any piece of voice or text.</p> | <p>Value is captured through Conversational AI which is used to enhance the patient's or member's experience by providing more efficient, convenient and accessible interactions between health systems, medical professionals, insurers and patients in the healthcare industry.</p> |

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| 21 | <p>Interstellar Lab France 2, 6, 7, 11, 15 AI, advanced materials, 3D printing</p> | <p>The company helps humans live in harmony with the environment both on Earth and in the future on Mars by developing living pods with optimal conditions for humans and plants.</p> | <p>The company has developed a closed-loop, environmentally controlled and modular station by using a space exploration design approach, 3D printed material systems, advanced biosystems technologies and AI-based monitoring and control. A station is a combination of sealed modules; each of them can generate and recycle food, air and water to support life for a group of people.</p> | <p>The company aims to preserve biodiversity and sustain human life. They accelerate the transition to environmental regenerative solutions on Earth by creating integrated food production and water and waste recycling system.</p> |
| 22 | <p>Karamba Security USA 11 Cybersecurity</p> | <p>It is an embedded cybersecurity solutions provider for connected systems in the automotive industry, IoT and the enterprise edge.</p> | <p>The XGuard suite offers unrivalled self-protection against the loss of device control. Karamba XGuard can identify and stop buffer overflows, which can lead to external malicious code or code reuse attacks (such as return-oriented programming). Manufacturers may use these solutions to apply this technology to seal systems automatically during manufacturing.</p> | <p>With negligible network overhead, value is captured by concealing network traffic by verifying the sender of every communication. Unauthorised communications and over-the-air (OTA) malware are prevented via authenticated encryption (AE).</p> |
| 23 | <p>Latitudo 40 Italy 2, 3, 6, 7, 9, 11 AI, big data, cloud computing, Internet of Things</p> | <p>They convert satellite photos into geospatial data to ease and improve decision-making processes. They use AI and machine learning algorithms to filter and elaborate the photos.</p> | <p>It's a cloud-based Unified Data Analytics tool that extracts data from satellite pictures and IoT data automatically. They use a back-end link to their partners' planning systems to accomplish automated tasking on a large number of satellites. They sift through petabytes of data from a variety of sensors and constellations. Their image capture engine can locate the best image and trim away the area required for any given investigation.</p> | <p>Value is captured by providing more efficient object detection, better visualisation of land use, urban heat islands and coastline erosion detection services and more precise farming. Moreover, the inventory and asset management, building density analysis and environmental hazard and risk assessment can be enhanced as well.</p> |

(continued)

Table 13.1 (continued)

| No | Company info | Value proposal (what?) | Value creation (how?) | Value capture |
|----|---|---|---|--|
| 24 | Neer Technologies USA 6, 11, 12 AI, Internet of Things | It is a fully integrated real-time water management platform powered by AI and machine learning. | They simulate and evaluate the risk status of drinking water distribution mains, sewage treatment plants and stormwater collection systems. They employ machine learning to detect leaks and anticipate system breakdowns in the water, sewage and stormwater collecting systems. | Revenue is earned through managing and planning drinking water, wastewater and stormwater systems more effectively and creating safer and cost-effective water systems in the long term. |
| | 25 | Nordsense Denmark 11, 13 AI, autonomous vehicles, big data, Internet of Things, robotic process automation | The company provides services in the waste management industry by using sensors and data. They aim to halve waste collections by picking bins up once the sensors go on with punctuality. | It provides real-time data on customers' bins and waste generation patterns with Smart Bin Sensors. Benefiting from IoT and Autonomous Things, they keep track of the location and movements of waste containers, and secure containers against theft, and increase the transparency of daily waste operations with asset tracking, which is ensured by using intelligent route trucks using AI. Smart sensors help robotic process automation to detect fill rates. |
| 26 | Numina USA 9, 11 AI, big data, Internet of Things | The company's computer vision-enforced sensors collect mobility data from open spaces. The processed data provide important insights into how people move within urban spaces. These insights allow urban planners to design cities that are inclusive, liveable and sustainable. | Numina's goal is to use data to help cities become more adaptive and egalitarian. Numina employs computer vision to track all types of activities on the street and provides new insight to city planners, facility managers, mobility operators and real estate developers. Numina displays the volumes, pathways, dwell durations and other behaviours of people, cyclists, various types of cars, pets, garbage bags and more – all in digital formats that are easily consumable. | The data they provide allow designers to make better-informed choices about people's needs which results in more inclusive and equitable cities. Their mission makes use of the mass amounts of data generated by people's activities in public spaces and provides economic, environmental and societal benefits to everyone involved. |

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|----|--|--|---|--|
| 27 | <p>One Click LCA Finland 11, 13 Big data</p> | <p>The company produces software that helps calculate and reduce the environmental impacts of any building, thanks to stored data in its database.</p> | <p>To be able to make life cycle assessment (LCA) interpretations, known data are stored by using Big Data technology. For LCA, benefiting Big Data provides an advantage by finding, accessing and reusing relevant data.</p> | <p>Easy and affordable carbon assessment and life cycle assessment (LCA) by using big data.</p> |
| 28 | <p>Optibus Israel 11 AI, cloud computing</p> | <p>It is a cloud-native AI platform and software-as-a-service (SaaS) company that plans and schedules complex transit operations and the movement of vehicles and drivers to improve the quality and reliability of transit service.</p> | <p>Customers can use AI and cloud computing to model their transportation network (rules and preferences) at a granular level, allowing schedulers and operations executives to compare scenarios, publish reports and answer complex questions, transforming the related operation into a smart, data-driven business.</p> | <p>Economic, environmental and social value is generated by making effective use of a combination of AI optimisation algorithms and distributed cloud computing to make public transportation smarter and nourish freedom of movement and sustainable cities while reducing costs by modelling the transportation network and creating optimal routes, timetables and vehicle schedules with these technologies.</p> |
| 29 | <p>OurCrowd Israel 11 Crowdfunding</p> | <p>The company is a venture capital-crowdfunding hybrid platform for accredited investors facilitating investments in Israeli startups.</p> | <p>OurCrowd finds deals, does due diligence and makes investments available to its members, all while investing its own money. Through board seats and a mentorship programme that matches entrepreneurs with OurCrowd contacts from relevant sectors, it plays an active role in the firms it funds.</p> | <p>They build value for its portfolio companies throughout their life cycles, providing mentorship, recruiting industry advisors, navigating follow-on rounds and creating growth opportunities through its network of multinational partnerships.</p> |

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Table 13.1 (continued)

| No | Company info | Value proposal (what?) | Value creation (how?) | Value capture |
|----|---|---|---|---|
| 30 | <p>Phantom AI</p> <p>USA</p> <p>11</p> <p>AI, autonomous vehicles</p> | <p>It is an autonomous vehicle company that presents a comprehensive autonomous driving platform featuring computer vision, sensor fusion and control capabilities with AI solutions.</p> | <p>They employ a Deep Learning-based computer vision solution to detect vehicles, pedestrians, bicyclists, free-space, traffic signs and traffic lights, as well as optimal data, which includes all types of corner cases for deep learning and novel data augmentation techniques to increase data diversity. Autonomous cars also employ a Deep Learning detection pipeline with powerful tracking techniques.</p> | <p>Revenue is captured through PhantomVision which has real-time detection and target tracking on a bird's-eye view that provides safe driving with an accurate motion estimate of road objects to various Advanced Driver-Assistance Systems functions such as Auto Emergency Braking, Adaptive Cruise Control, Traffic Jam Assist and Lane Keeping Assist System.</p> |
| 31 | <p>Pirelli</p> <p>Italy</p> <p>3, 7, 11, 12</p> <p>Advanced materials, biotech & biomufacturing, energy storage</p> | <p>It is a tyre company that has one project named "cycl-e around" aiming for sustainable transportation.</p> | <p>In these bikes, advanced materials are used in bicycle frames and biomaterials used in tires. E-bikes have a 500 Wh battery for energy storage.</p> | <p>Revenue is achieved through convenient, healthy and sustainable mobility for customers .</p> |
| 32 | <p>Print Your City</p> <p>Netherlands</p> <p>11, 12</p> <p>3D printing, recycling</p> | <p>It is a company that transforms cities' plastic waste into custom urban furniture for public spaces using recycling and 3D printing.</p> | <p>With a robotic arm and recycling facilities, plastic waste that is brought by citizens is custom designed as urban furniture through a plastic waste loop with technologies like 3D printing and recycling at the local level. This technological solution enables a sustainable city and less CO₂ emissions through combining modular repair and mass customisation.</p> | <p>The Pots Plus collection is an environmentally friendly furniture company that creates its collection by using the plastic waste of cities and turns them into furniture which follows ergonomic curvatures to suit the natural geometries of the human body.</p> |
| 33 | <p>Quantafuel</p> <p>Norway</p> <p>11</p> <p>Advanced materials, recycling</p> | <p>Quantafuel developed a patented technology that converts mixed plastic waste, including non-recyclable plastic waste, into advanced low-carbon synthetic fuel and chemicals.</p> | <p>They developed a technology that purifies the gas formed by the process and alters the molecules. This supplies them with a way to create a chemically recycled attractive product that satisfies a huge demand in the market.</p> | <p>Revenue and environmental value are captured by using waste plastics to create two major products: synthetic diesel fuel and recycled naphtha. Recycled naphtha is used by petrochemical companies to create better quality plastics, while premium-quality synthetic diesel fuel is used by individual consumers.</p> |

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|----|--|--|---|--|
| 34 | <p>Intel USA 3, 7, 11 AI, edge computing, Internet of Things</p> | <p>Together with many other applications, the company provides Intelligent Transportation Systems for smart cities of the future.</p> | <p>IoT and AI facilitate intelligent transportation systems for land, air, rail and sea. These systems link automobiles, traffic lights, toll booths and other infrastructure to help alleviate traffic congestion, avoid accidents, decrease emissions and improve transportation efficiency. Fleet management, intelligent traffic management, Vehicle-to-Everything (V2X) communication, electric vehicle charging, electronic toll collecting and a variety of other mobility solutions are examples.</p> | <p>Extra value is captured, thanks to edge computing and inference, with which customers can benefit from fast response times, free up bandwidth and help keep sensitive data private.</p> |
| 35 | <p>Restado Germany 11,12 AI, recycling</p> | <p>The company transforms architecture, construction, craft and commerce materials and ensures that they can be reused.</p> | <p>Using an AI-based matching algorithm, the platform promotes change by matching the supply of materials from demolition with the overstock from demand in new projects.</p> | <p>Reusing building materials saves energy, emissions and waste while also requiring less new production, less resource-intensive recycling processes and less landfill.</p> |
| 36 | <p>Sigfox France 11 Internet of Things, wireless power transfer</p> | <p>The company is a service provider of network and IoT. Its network provides service to billions of devices to connect to the Internet.</p> | <p>The firm is deploying a 0G network to monitor billions of items transmitting data without the need to build and maintain network connections. 0G networks are software-based communication solutions that manage all networks and compute complexity in the Cloud rather than on the devices. They provide wireless signalling overhead, a small and efficient protocol and devices that are not connected to any network in the globe.</p> | <p>Its network allows devices to connect to the Internet while consuming as little energy as possible and drastically reduces the energy consumption and costs of connected devices.</p> |

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Table 13.1 (continued)

| No | Company info | Value proposal (what?) | Value creation (how?) | Value capture |
|----|--|--|---|---|
| 37 | <p>Skeleton Technologies</p> <p>Germany</p> <p>11, 13</p> <p>Energy storage</p> | <p>The company is the ultracapacitor-based energy storage. They deliver solutions across the industry for customers with needs for high power, high energy and long-life energy storage.</p> | <p>The company provides ultracapacitor technology driven by advances in nanomaterials, the electrification of infrastructure and industry and fuel efficiency and emissions in the automotive and transportation segments. Proprietary raw material, “curved graphene”, provides ultracapacitors with an advantage in power and energy density.</p> | <p>Revenue is captured by developing and manufacturing ultracapacitors that have very little internal resistance (down to 0.12 mΩ). In order to increase sustainability in cities, it develops environmentally friendly capacitors for big vehicles such as cars, buses and trains.</p> |
| 38 | <p>Skycatch</p> <p>USA</p> <p>11</p> <p>AI, drones, edge computing</p> | <p>The data company focuses on indexing and extracting critical information from the physical world using drones and AI.</p> | <p>A cloud-based and edge-based 3D reconstruction engine converts 2D photos into high-precision 3D point clouds and models. To ensure data is matched with current data, it fully automates the transfer of global coordinates to project/local coordinate systems. Then it pulls many sorts of measures from 3D data automatically. It enables users to execute 3D data analysis, such as parallel volumetric measurements and continuous time output for cloud platforms, among other things.</p> | <p>Revenue generation is achieved by reducing the amount of time to capture and process data.</p> |
| 39 | <p>SmartCultiva</p> <p>USA</p> <p>11</p> <p>Big data, cloud computing, Internet of Things</p> | <p>The company delivers a set of sensors, connected devices and software for farm management. They design and manufacture nano-sensing devices that offer real-time monitoring and control solutions essential to the new generation of farmers.</p> | <p>Nano CL Series B measures humidity, air, water temperature, light intensity, carbon dioxide levels and soil moisture before transferring this data to cloud-based IoT applications using various network protocols. The information is accessible on both mobile and web applications. The product is operated by solar energy and an ion lithium battery.</p> | <p>Revenue is captured through producing sensing devices to help the farmer with full real-time data and metrics, to monitor the entire farming business.</p> |

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| 40 | <p>Smarten Spaces Singapore 11 AI</p> | <p>The company aims to help deliver experiences in the spaces of the future with AI for workplace management, space management and tenant engagement.</p> | <p>They create a revolution in working experience by utilising AI technology and bringing the workplace and employees together. They provide an end-to-end SaaS solution for the digital workplace, as well as an AI-powered tenant management system with adjustable features such as contactless access, safety protocols and proximity alerts.</p> | <p>Revenue is captured by enabling optimal future-ready spaces for the users. Their AI-based solutions allow users to make informed financial decisions based on how their spaces are being utilised while also enhancing the experiences with the spaces.</p> |
| 41 | <p>Spacemaker Norway 11 AI, cloud computing</p> | <p>It is a cloud-based AI software for real estate sites that empowers teams to collaborate, analyse and design sustainable cities.</p> | <p>They work with cloud-based AI to perform feasibility studies and optimise site proposals for density and living qualities and contribute to reducing the speed of site assessments using ready-to-use data sets, a digital 3D model and a quick simulation of alternative planning scenarios.</p> | <p>Revenue is captured through designing smart proposals and solving site constraints and density requirements using real-time analyses and generative design.</p> |
| 42 | <p>Ubicquia USA 9, 11 AI, Internet of Things</p> | <p>It is an IoT smart city platform that offers vital services such as lighting management, video AI, and public Wi-Fi.</p> | <p>Its plug-and-play network can transform any existing street light into a multi-function router by using AI, supporting a growing range of services such as sophisticated lighting controls, public Wi-Fi and the connection to third-party sensors such as air quality monitors and surveillance cameras with IoT.</p> | <p>Revenue is captured by providing a cost-effective and extensible IoT platform for smart city services to municipalities, utilities, broadband service providers and lighting manufacturers. Their products are intended to assist utilities and communities in detecting, anticipating and utilising AI in order to prevent outages before they occur.</p> |
| 43 | <p>Ucomposites Denmark 9, 11, 12, 14 Advanced materials, recycling</p> | <p>The firm focuses on recycling composite materials and glass fibres, as well as supplying virgin-quality recycled fibres (advanced materials) to important industry sectors including automotive, building materials and oil and gas.</p> | <p>The company accumulates and recycles previously used glass fibre materials. They work in the advanced material technology field which makes it possible to develop the same quality as the virgin alternatives.</p> | <p>Value is captured by reducing the environmental impact of waste management. Life cycle assessment (LCA) is used to document the carbon footprint of recycled materials.</p> |

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Table 13.1 (continued)

| No | Company info | Value proposal (what?) | Value creation (how?) | Value capture |
|----|---|--|--|---|
| 44 | Urban Footprint | The software company's urban Intelligence platform helps public and private-sector organisations prioritise investments and resources where they are most needed, collecting data and applying it to make long-term recommendations. | It is aimed to store data in the housing, energy and finance sectors of various cities and to benefit the public and private sectors when necessary. The firm uses cloud-based software and web-based software. With the software it uses, it regularly transfers the necessary data from many complex and intensive data to the user. | Value is created by sustainable and profitable suggestions obtained using Big Data. They create value by saving the customer's time by serving them certain data about a specified region or neighbourhood before they take an action. |
| | USA | | | |
| | 1, 2, 4, 7, 12 Big data | | | |
| 45 | Urban SDK | It is an IoT-based planning tool that uses real-time location information to help smart cities improve mobility, transit, sustainability and safety operations. They use big data and cloud computing to retrieve real-time data. | They use big data and cloud computing to display traffic counts and trip demand by measuring the number of travel across autos, motorcycles and pedestrians. Furthermore, real-time traffic speeds are used to assess congestion and dependability. By anticipating heat maps at different time periods and route segments, it also helps to predict collisions and assure traffic safety. | Value is produced by delivering better data to government agencies, politicians and the general public, allowing them to make more informed policy and budgetary choices with the IoT platform, thanks to the use of big data and cloud computing. |
| | USA | | | |
| | 11 Big data, cloud computing, Internet of Things | | | |
| 46 | View | The company produces sustainable smart windows which are digital and connected and can be controlled from anywhere. | They make smart windows that reject solar radiation and glare while maintaining a comfortable temperature. The electrochromic coating is made up of multiple thin layers of metal oxide, and they use electrochromic technology to predictably adjust tint levels in response to external conditions and user preferences. | Value is achieved through their smart windows which automatically adjust in response to the sun to increase natural light and access to views. This is done to improve people's health and wellness by reducing headaches, eyestrain and drowsiness while simultaneously saving energy. |
| | USA | | | |
| | 3, 7, 11, 12 Advanced materials | | | |

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|----|--|--|---|--|
| 47 | <p>Visionful USA 11 AI, edge computing</p> | <p>It's a platform that uses AI and edge computing to give real-time parking assistance, fully automated parking enforcement and predictive analytics.</p> <p>The company makes smart vehicles using AI and autonomous things technologies by adding features like lane-keeping and fuel tracking.</p> | <p>They present edge-computing based sensors, employ algorithms for parking space classification and have large and consistent datasets. These features give rise to implement advanced deep learning techniques for parking lot recognition. Their real-time deep learning occupancy recognition is a solution for increasing the parking experience of drivers.</p> <p>The company's cars are designed for complete autonomy, with sensors that provide 360-degree views and lasers that can identify objects up to 300 metres away. Radar is used to look around cars and track moving things, while short-range lasers detect and focus on items close to the vehicle, thanks to AI.</p> <p>They enable their AD vehicles and AI-driven algorithms to plan and execute safe, dependable and human-like driving in complicated dynamic settings by providing real-time HD Map and localisation supported by numerous sensors, including LiDAR, camera, GNSS and INS. Each day, their data is sent to a data processing platform, and labelling data is created.</p> <p>The company provides a way to build a cost-efficient and energy-efficient hyperloop system for city-to-city travel at high speeds. A combination of vehicle technologies for the cruise phase integrated into the pod, with infrastructure systems for acceleration and deceleration provides the system with scalability and capacity, radically reducing infrastructure stress.</p> | <p>Revenue is collected by using a specialised GPU and AI software to monitor a 360-degree view. These self-contained and portable devices may be powered by solar panels and have their own IoT cellular connections, eliminating the need for power and network infrastructure. Transferring huge files to the cloud is, no longer necessary thanks to edge computation.</p> <p>They provide a safe and effortless driving experience to customers by transforming their cars into smart cars by implementing AI technology. One of the aims of the company is to decrease the number of deaths inflicted by a car crash.</p> <p>Value is captured by providing accurate recognition that outperforms human drivers, multi-sensor fusion at multiple levels to improve perception quality, multiple perception paths to achieve redundancy and powerful models and algorithms to recognise long-tail objects by using AI.</p> <p>The company's hyperloop system is up to 5–10 times more energy-efficient than an aeroplane for the same inland route and operates with 0 direct emissions with a fully electric powertrain. These provide safety and reliability for communities.</p> |
| 48 | <p>Waymo USA 11 AI, autonomous vehicles</p> | <p>The autonomous driving (AD) company develops high-driving automation and self-driving technologies by using AI.</p> | <p>The autonomous driving (AD) company develops high-driving automation and self-driving technologies by using AI.</p> | <p>Value is captured by providing accurate recognition that outperforms human drivers, multi-sensor fusion at multiple levels to improve perception quality, multiple perception paths to achieve redundancy and powerful models and algorithms to recognise long-tail objects by using AI.</p> <p>The company's hyperloop system is up to 5–10 times more energy-efficient than an aeroplane for the same inland route and operates with 0 direct emissions with a fully electric powertrain. These provide safety and reliability for communities.</p> |
| 49 | <p>Weride China 11 AI, autonomous vehicles</p> | <p>The autonomous driving (AD) company develops high-driving automation and self-driving technologies by using AI.</p> | <p>The autonomous driving (AD) company develops high-driving automation and self-driving technologies by using AI.</p> | <p>Value is captured by providing accurate recognition that outperforms human drivers, multi-sensor fusion at multiple levels to improve perception quality, multiple perception paths to achieve redundancy and powerful models and algorithms to recognise long-tail objects by using AI.</p> <p>The company's hyperloop system is up to 5–10 times more energy-efficient than an aeroplane for the same inland route and operates with 0 direct emissions with a fully electric powertrain. These provide safety and reliability for communities.</p> |
| 50 | <p>Zeleros Spain 7, 8, 9, 10, 11, 13 Energy storage</p> | <p>The company designs and develops new technologies for sustainable and efficient transportation, which will allow travelling at 1000 km/h with renewable energies, combining the best from the aeronautics and the railway industries.</p> | <p>The company designs and develops new technologies for sustainable and efficient transportation, which will allow travelling at 1000 km/h with renewable energies, combining the best from the aeronautics and the railway industries.</p> | <p>The company designs and develops new technologies for sustainable and efficient transportation, which will allow travelling at 1000 km/h with renewable energies, combining the best from the aeronautics and the railway industries.</p> |

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