Index

Accelerated weathering, 135 Accessibility, 265 Advanced clean energy technologies, 134 Afforestation, 129 Agriculture, 131 Air pollution by efficient transportation system, reduction of, 170 Air quality improvement, 131 Air quality index (AQR), 165 Akaike Information Criteria (AIC), 242 Alternating current (AC), 181 AMP Robotics, 90 Amsterdam, Netherlands, 65 Amsterdam Circular Challenge, 29 Amsterdam Circular Innovation Programme, 29 'Amsterdam City Doughnut' initiative, 28 - 29Amsterdam's Circular Buiksloterham project. 45 Amsterdam's circular construction practices, 30 Analytic approach, 34 Artificial intelligence (AI), 2, 10, 50, 52, 68, 72, 84, 98, 100, 140-141, 148-150, 216-217 AI-based data services, 54 AI-driven data collection and analysis, 87-88 AI-driven sorting systems, 87 AI-enabled predictive analytics, 86 AI-enhanced waste management and recycling, 90 background and context of CE in smart cities, 84-85

behavioural insights and citizen engagement, 91-92 benefits and challenges of AI-enhanced CE in smart cities. 93 call for collaborative efforts, 93 case study, 228-229 citizen engagement and behaviour analysis, 87 complex data handling and analysis, 86 efficiency in circular supply chains, 86 enhanced waste management, 87 explanation of IoT sensors and data collection mechanisms, 88 future potential, 93 literature review. 216-219 policy effectiveness and adaptation, 87 predictive analytics for CE planning, 88-89 predictive capabilities for optimization, 86 in processing and analysing vast datasets, 88 product design and lifecycle analysis, 91 rationale for integrating AI technologies into CE practices, 86-87 regulatory compliance and policy adaptation, 92 research objectives, 85 research scope, 86 resource tracking and circular supply chain optimization, 89 scope and future work, 230

sustainable product design, 87 use of AI, 219-228 ASEAN Free Trade Area (AFTA), 40-41 Assessment process, 30 Association of South-East Asian Nations (ASEAN), 37, 238 - 239Economic Community, 44 Augmented reality (AR), 267 Automated driving systems, 199 Automation, 2, 17-18 Autonomous vehicles revolutionizing urban mobility, 202-203 Autoregressive distributed lag (ARDL), 236–237, 239, 241 Bounds Approach, 242 Avatars, 271

Balance of Plant (BoP), 181 Barriers and challenges circular economy in smart cities with available, 139-140 content analysis, 147-150 descriptive analysis, 142-147 limitations and scope for future research, 154-155 methodology, 141-142 practical implications, 154 results, 142-150 theoretical implication, 154 Battery electric vehicles (BEVs), 183 Behaviour analysis, 87 Behavioural change, 135 Bibliometric analysis (see also Content analysis), 10, 18-19, 141-142, 152, 154 data analysis and result, 11-16 data collection, 10-11 future work, 20 identification of research gaps, 11 limitations, 19 methodology, 10-11 results, 17 theoretical implementations, 18-19 top co-authorship analysis, 14-16

top journals, authors and countries, 11 - 13top key areas of smart cities and CE, 14 Bibliometric data, 12–13 Big data, 68, 72 analysis techniques, 227 analytics, 10 Bio economy (BE), 50-52 Biodiversity conservation, 130 Blockchain technology, 61, 109–110, 153 Blue economy, 27 Breusch-Godfrey LM test, 242 Brightfiber Textiles, 28–29 Building Circularity Index (BCI), 30 Bus Rapid Transit systems (BRT systems), 198 Business model, 26-27 Business organizations, 120-121

California, HFCVs, 187 Capital accumulation, 248, 253 Car-sharing, FCVs, 188 Carbon capture and removal technologies, 135 Carbon capture and storage (CCS), 177 Carbon dioxide (CO₂), 126 Carbon footprints via green initiatives, reduction in, 170-171 Carbon removal and capture, 132 Carbon sequestration process, 132 Causality, 243 analysis, 248-253 China, HFCVs, 187 Circular Buiksloterham project, 29 Circular business models, 80 Circular construction practices, 29 - 30Circular economy (CE), 10, 24, 50, 52-53, 59-61, 72, 84, 127, 139-140, 215-216 Amsterdam, Netherlands, 28, 65 Amsterdam Circular Innovation Programme, 29

background and context of CE in smart cities. 84-85 behavioural change, 128-129 case studies and comparative analysis, 75-76 case studies around world, 28, 33, 64,66 CE-IoT architecture for smart city, 55-56 challenges in achieving, 127-129 challenges in implementation, 73 circular construction practices, 29 - 30circular textile industry, 28-29 Columbian waste management system, 65–66 comparative insights, 76 conceptual framework for CE in smart cities. 74 cross-sector collaboration. 78 data analysis procedure, 34 design, 33 different phases of industrial revolution, 60-63 economic implications, 127-128 emergence and evolution of concepts, 72 emerging trends in smart city technologies and CE principles, 79-80 enhancing CE infrastructure, 77-78 equity, constitution justice, 129 European context, 75-76 future directions and research opportunities, 79-80 global perspectives, 76 industrial transformation, 128 industry 4.0 scenario in, 55 integration of, 72 legal frameworks for circular economy initiatives, 63-64 leveraging digital platforms, 78 methodology, 33-34 natural carbon removal, 129 overcoming barriers, 73 paradigm, 10

policy implications, 42-45 policy recommendations, 77 PPP model in Suzhou, China, 67-68 product design, 66 rationale for integrating AI technologies into, 86-87 remanufacturing, 66-67 research scope and contributions, 73 sample, 33 Seoul, South Korea, 30–33 smart city technologies and CE implementation, 73-75 stakeholder engagement and community involvement, 78 - 79strategies for overcoming barriers, 77-78 Strategy for HCMC, 39 SWOT analysis of HCMC in implementing CE, 34-42 symbiosis between IoT and, 53-55 technological innovations, 77, 127 theoretical framework on, 26-28 top key areas of, 14 unexplored areas in smart cities and **CEs.** 79 in urban context, 74 Circular economy practices (CEP), 126 advanced clean energy technologies, 134 carbon capture and removal technologies, 135 case studies, 133-134 challenges in achieving CE, 127-129 commitment to net-zero emissions, 134 contributions, 126-127 Energiewende, 133–134 environmental and equity justice, 135 future research trends and recommendations, 134–135 grid integration and energy storage, 134-135 opportunities for ecological sustainability, 129-131

renewable energy success, 134 social and behavioural change, 135 structure, 127 sustainable materials, 135 wind power and energy transition, 133 Circular Innovation District, 73 Circular supply chains efficiency in, 86 optimization, 89 Circular textile industry, 28-29 Circularity index, 30 Citizen engagement, 87, 198 Climate change, 177 mitigation, 131 Closed Substance Cycle and Waste Management Act (1996), 28 Closed-circuit television (CCTV), 54 Cloud analysis, 147-148 Co-authorship analysis, 14-16 Cobb-Douglas production function, 240 Coding process, 34 Cointegration analysis, 236-237, 247 Columbian waste management system, 65-66 Commercialization, 179 Community, 130 community-based approaches, 79 involvement, 78-79 Commuters, 271 Comparative analysis, 76 Comprehensive and Progressive Agreement for Trans-Pacific (CPTPP), 40-41 Conceptualization, 178 Conference of Parties 26 (COP 26), 176 Connected vehicles. 267 Constitution justice, 129 Consumer behavior, impact of ESG reporting on, 112-113 Content analysis, 147-150 countries collaborations world map, 150 keyword analysis, 147-149 thematic analysis, 149-150

Control systems, 181 Conventional combustion vehicles, 176 Corporate equity, 130 Corporate ESG reporting, importance of, 110-113 Corporate responsibility, disclosure of ESG performance as, 113-116 Corporate Social Responsibility (CSR), 62 function, 108 and profitability as business objectives, 113-114 promotion of diversity and inclusion as, 114-115 Corporate sustainability reporting, challenges for, 116–117 Cradle-to-cradle, 27 Cumulative sum (CUSUM), 242 Customer relationship management (CRM), 53-54 Customers, 112 Cutting-edge technologies, 10 Cyber physical systems (CPS), 50-52 Data analysis, 54 procedure, 34 Data analytics, 98, 100

Data collection mechanisms, explanation of, 88 Data-driven decision-making, 261-262 Database management systems (DBMS), 53-54 Decision-makers, 6 Deep learning technologies, 140 Delhi Metro, 161, 169-171 electric mobility, 171 fulfilment of energy needs through renewal energy, 169-170 reduction in carbon footprints via green initiatives, 170-171 reduction of air pollution by efficient transportation system, 170

save energy in natural ways, 170

Delhi Metro Rail Corporation (DMRC), 170 Descriptive analysis, 142–147 main information. 142–143 most cited and relevant sources and citations, 144-146 relevant affiliations and countries, 146-147 scientific annual production and average total citation per year, 144 Developing economies, 198 Digital age, ergonomic workspaces in, 3-4 Digital city, 28 Digital platforms, 78 Digital twins, 265–266 Digitalization, 61-62, 80, 147-148 Direct air collection, 135 Diversity, equity and inclusion (DEI), 112 Diversity as CSR, promotion of, 114-115 Dynamic OLS (DOLS), 240 E-business system, 61 E-governance, 198 Eco-industrial parks (EIPs), 32 Ecological sustainability air quality improvement, 131 biodiversity conservation, 130 carbon removal and capture, 132 conservation of natural habitats, 132 energy independence, 130 enhanced ecosystem resilience, 133 enhanced resilience, 130 global leadership and cooperation, 133 good health and well-being benefits, 129-130 impact in environmental context, 131-133 mitigating climate change, 131 opportunities for, 129-131 promotion, 132

renewable energy expansion, 132 social and corporate equity, 130 sustainable agriculture practices, 132 - 133sustainable and precision agriculture, 131 sustainable transportation, 130 Economic barriers, 184 Economic growth, 236–237 Economy, smart city technologies in developing, 198-199 Ecosystems, 130 of smart city, 100 Electric cars, 185, 196 Electric mobility, 171 Electric motor, 181 Electric vehicles (EVs), 162, 176, 195–196, 201–202 Electrolyte membrane, 180 Embodiment, 265 Emerging markets, 229 Emissions reduction strategies, 126-127 Employees in Industry 4.0, 4–5 Energiewende programme, 133–134 Energy efficiency, 182-183, 227 Energy independence, 130 Energy management, 227 Energy storage, 134–135 Energy transition, 133 Engagement, 2–3 Enhanced ecosystem resilience, 133 Enhanced resilience, 130 Enhanced waste management, 87 Enterprise resource planning (ERP), 53-54 Entrepreneurial ventures, 117-118 Environment, 169 Environment, Social and Governance (ESG). 61 Environmental, Social and Governance reporting (ESG reporting), 108, 110 benefits of good ESG performance, 111 - 112

CSR and profitability as business objectives, 113-114 determinants of ESG disclosure, 115 - 116disclosure of ESG performance as corporate responsibility, 113-116 impact of ESG reporting on consumer behavior, 112-113 performance, 110-111 promotion of diversity and inclusion as CSR, 114–115 Environmental barriers, 185 Environmental issues, 228 Environmental justice, 135 Environmental sustainability, 80 Equity, 129 Equity justice, 135 Ergonomic workspaces in digital age, 3-4 profound impact on well-being and productivity, 3-4 Europe, HFCVs, 187–188 European context, 75–76 European Free Trade Association (EFTA), 40-41 Extant literature, 161 Extended producer responsibility (EPR), 63 Fairphone (Amsterdam-based

Fairphone (Amsterdam-based smartphone manufacturing company), 229 Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) II scheme, 201 Feasibility, 189 Financial constraints, 75 Financial Fund for Urban Development, The, 65 Financial ramifications, 128 Firms, 117–118 Fuel cell, 176 stack, 180 Fuel cell hybrid vehicle (FCHV), 179 Fuel cell vehicle (FCV), 176 Geographic information system (GIS), 265 Global E-Waste Monitor white, 229 Global economy, 215-216 Global initiatives, 110 Global Reporting Initiative (GRI), 116 Global temperatures, 131 Global urbanization, 10 Google, 134 Granger non-causality, Toda-Yamamoto approach to. 243 Green and Blue Infrastructure (GBI), 153 Green economy (GE), 50-52 Green initiatives, reduction in carbon footprints via, 170-171 Green technologies, 80 Greenhouse gas (GHG) emissions, 126, 161, 196 Grid integration, 134-135

Helsinki's MaaS system, 196 Ho Chi Minh City (HCMC), 24-25, 37-38, 40-42, 44 diversified economic sectors, 36 SWOT analysis of HCMC in implementing CE, 34-42 Honda, 179 Human-centred workplace in Industry 4.0autonomy and collaboration, 4-5 background and context, 2 case studies and practical implementations, 5-6 ergonomic workspaces in digital age, 3-4 purpose and scope of conceptual paper, 3 Siemens' factory of future, 5-6 significance of human-centred workplaces in Industry 4.0, 2 - 3

Spotify's agile squads, 5 strategies, 6 Hydrogen (H₂), 176–177, 179 fuel cells, 176-177 storage, 180 Hydrogen fuel cell vehicles (HFCVs), 176 benefits, 181-183 brief overview of, 176 California, 187 case studies, 186-189 18th century beginnings, 177 challenges and barriers to HCFV's successful deployment, 183-185 China. 187 commercialization, 179 conceptualization, 178 early 19th century, 178 economic barriers, 184 energy efficient, 182-183 environmental barriers, 185 environmental benefits, 182 Europe, 187-188 examples of successful HFCV deployments, 186–188 expanding infrastructure, 179 explanation of basic principles of hydrogen fuel cells, 179 - 180first commercial deployment, 178-179 government initiatives, 188–189 historical context of hydrogen fuel cell technology, 177-178 historical development, 177-179 hydrogen fuel cells work, 179-181 importance of hydrogen as clean energy source, 176-177 Japan, 187 key components of hydrogen fuel cell system, 180-181 legal barriers, 185 milestones in development of, 178 - 179political barriers, 183

range and refuelling advantages, 183 real-world applications for net-zero future. 188 research and development, 179 social barriers, 184 South Korea, 187 space race and NASA, 178 suggestions, 189-190 technical and infrastructure barriers, 184-185 Hyundai, 179 Immersion, 264-265 Immersive virtual experiences, 261–262 Inclusion as CSR, promotion of, 114-115 Indian Ministry of Transport, The, 201 Industrial revolution, different phases of, 60-63 Industrial Symbiosis (IS), 32-33 Industrial transformation, 128 Industrial wireless sensor networks (IWSNs), 205-206 Industries, 128 Industry 4.0, 2–3 empowering employees in, 4-5 scenario in CE, 55 significance of human-centred workplaces in, 2-3 Information and communication technology (ICT), 72, 99, 162, 194, 262-263 Infrastructure barriers, 184-185 Integrated smart transportation technologies, 199 Integrated transportation systems, 200 - 201Intelligent garbage classification technology, 227 Intelligent traffic management systems, 227 Intelligent transportation systems (ITS), 168-169, 197, 267 WSNs for, 205–206

Interactivity, 265 Interdisciplinary research, 10, 14 International data corporation report, 55-56 International Energy Agency (IEA), 186 Internet of Things (IoT), 2, 10, 17–18, 50, 72, 98, 147-150, 218, 228 CE-IoT architecture for smart City, 55-56 industry 4.0 scenario in CE, 55 linear economy vs. CE, 52-53 opportunities and challenges in implementing IoT-CE infrastructure, 56-57 protocols, 206-207 sensors, 88 symbiosis between IoT and CE, 53-55 Intrusion detection system (IDS), 205-206 Japan, HFCVs, 187 Jarque-Bera statistics (JB statistics), 242 Keyword co-occurrence analysis, 148-149 Korean Environmental Industry & Technology Institute (KEITI), 45 Kozaza (home-sharing platform), 32 Kyoto Protocol, 126 Law on Environmental Protection (2020), 40Legal barriers, 185 Legal frameworks for circular economy initiatives, 63-64 Life Cycle Assessment (LCA), 90 Lifecycle analysis, 91 Linear 'take, make, dispose' model, 72, 84-85

Linear economy, 52-53, 60 Long-run results, 247-248 Machine learning (ML), 50, 52, 68, 104.140 Mental health, 3 Metaverse, 261–262 potential to smart city planning, 265-266 smart technology of, 264-265 Metaverse-driven mobility, 262, 266, 272 challenges and alternative remedies, 272-274 smart city and, 262-266 Metro cities, 164–165 Micro-mobility, solutions for, 203-204 Ministry of Construction, The, 255-256 Mixed reality (MR), 265-266 Mobility, 266-272 comparing urban and virtual, 269-272 urban, 267-268 virtual, 268-269 Mobility as a Service (MaaS), 195-196, 204-205 Monetization, 265 Multiple Country Publication (MCP), 146 - 147Municipal solid waste (MSW), 34-35 Nanum Car, 31-32 National Action Plan on Green Growth, 39 National Aeronautics and Space Administration (NASA), 178 Natural carbon removal, 129 Natural habitats, conservation of, 132 Natural processes, 129 Net-zero economy, 132 Net-zero emissions, commitment to, 134 Net-zero future, real-world applications for, 188

Netherlands, best practices of smart mobility in, 197 Network analysis metrics, 18-19 Nitrogen oxides (NOx), 131 Nongovernmental organizations (NGOs), 31, 64 Ontologies, 200 Ordinary least squares (OLS), 240 Original equipment manufacturer (OEM), 66-67 Oxygen supply, 180 Oyster card system, 200 Paris Climate Agreement (PCA), 176 People, place and technology (PPT), 262-263 Personal mobility, 188 Personalized learning, 3 Planet, approach to, 119-120 Plug-in electric vehicles (PEVs), 201 Policy and regulatory frameworks, 75 Policy changes, 129 Policy effectiveness and adaptation, 87 Power electronics, 181 Precision agriculture, 131 Predictive analytics for CE planning, 88-89 Process management, 224 Process optimization, 221 Product design process, 66, 91 Product lifecycle (PLC), 55 Product lifecycle management (PLM), 53-54 Product-as-a-service, 36 Productivity, 3-4 Profitability, 115, 120 CSR and profitability as business objectives, 113-114 Public procurement process, 65 Public transport electrification, 199 Public-private partnership (PPP), 64 model in Suzhou, China, 67-68 Qualitative content analysis

methodology, 34

Qualitative measures, 19 Qualitative research, 33 Quality of life, 160 Quantum key distribution (QKD), 206-207 Rail-based MRTS, 169 Real-time traffic management, 199 Recycle and reduced waste management, 225-226 Recycling, 24 Reduce, Reuse and Recycle (3R), 100 - 101Reforestation, 129 Regenerative design, 27 **Regional Comprehensive Economic** Partnership, 44 Regression techniques, 239 Remanufacturing, 66-67 Renewable energy, 80 sources, 132 success, 134 Renewal energy, fulfilment of energy needs through, 169-170 Research methods, 101 Resource availability optimization, 219 Resource efficiency, 100-101 Resource management, 73 Resource optimization, 75, 85, 140 Resource tracking, 89 Resource usage optimization, 219 Responsible consumption and production, 78 Reuse, reduce, recycle and reuse framework (4R framework), 118 Ridesharing platforms, 199 Scopus database, 19, 155 Self-driving cars, 208 Seoul, South Korea, 30–33 industrial symbiosis, 32-33 sharing economy in, 31-32

Zero Waste and Resource Circulation Plan, 31

Seoul Sharing City project, 31

Sharing Economy initiative, The, 31 Short-run results, 247-248 Singapore Green Label certification, 45 Single Country Publication (SCP), 146-147 Small and medium-sized enterprises (SMEs), 75-76 'Smart Bins' project, 88 Smart circular cities, 80 Smart cities, 10, 57, 72, 85, 98-100, 140, 149, 160, 194–195, 216, 262, 266 analysis, 101-103 architecture, 99 background and context of CE in, 84-85 benefits and challenges of AIenhanced CE in, 93 CE-IoT architecture for, 55-56 challenges of urban mobility, 162-165 and components, 262-263 data analytic and AI, 100 Delhi Metro, 169-171 implementation in, 75-76 implications and scope for future work, 104 integration of, 72 ITS, 168-169 literature review, 99, 101, 161, 165 Metaverse's potential to smart city planning, 265–266 paradigm, 140 practical implications, 171-172 rail-based MRTS, 169 real case studies, 164-165 research methodology, 165-166 research methods, 101 resource efficiency, 100-101 results, 166–171 smart cities. 162 smart energy, 102-103 smart health, 102 smart safety. 103 smart technology and smart mobility, 166-168

smart technology of metaverse, 264-265 smart transportation, 101-102 smart urban mobility, 162 top key areas of, 14 unexplored areas in, 79 Smart Cities Mission (SCM), 198, 201 - 202Smart city technologies (SCTs), 195, 199 and CE implementation, 73-75 autonomous vehicles revolutionizing urban mobility, 202-203 barriers and challenges to implementation, 74-75 best practices of smart mobility in Netherlands, 197 CE in urban context, 74 challenges facing in sustainable urban mobility, 207-208 conceptual framework for CE in smart cities. 74 emerging trends in smart city technologies and CE principles, 79-80 EVs, 201-202 in developing economy, 198–199 integrated transportation systems, 200-201 key initiatives of smart city technologies for sustainable urban mobility, 199 MaaS. 204–205 merits of sustainable urban mobility in smart city, 197-198 smart cities and sustainable urban mobility, 195-197 smart transportation communication protocols, 206-207 solutions for micro-mobility, 203-204 WSNs for ITS, 205-206 Smart education, 161 Smart energy, 102–103

'Smart everything' model, 140 Smart health, 102 Smart mobility, 196, 262–263 best practices of smart mobility in Netherlands, 197 indicators, 197 Smart parking systems, 203 Smart safety, 103 'Smart Street Bin' project, 87-88 Smart technology, 153, 197, 263 integration, 147-148 of metaverse, 264-265 and smart mobility, 166-168 Smart towns, 140-141 Smart traffic management systems, 196, 203-204 Smart transportation, 101–102 Social barriers, 184 Social change, 135 Social equity, 130 Solid waste management-based process optimization, 219-220 Solow framework, 236-237 South Korea, HFCVs, 187 Space race, 178 Special purpose vehicle (SPV), 67 Spotify's agile squads, 5 Stakeholder engagement, 78–79 Structural break tests, 245-247 Sulphur dioxide (SO₂), 131 Supply chain-related process optimization, 221 Sustainability, 20, 50, 52, 85, 108, 119–120, 147–148, 199 goals, 197-198 triple bottom line approach to, 118 - 120Sustainable agriculture, 131 practices, 132-133 Sustainable CE, 35 Sustainable cities and communities, 194 Sustainable city, 194 Sustainable consumption, 118 Sustainable design, 224-225

Sustainable development, 50 accomplishing SDGs as entrepreneurial objectives, 117 - 118benefits of good ESG performance, 111-112 challenges for corporate sustainability reporting, 116-117 disclosure of ESG performance as corporate responsibility, 113-116 ESG performance, 110-111 importance of corporate ESG reporting, 110-113 initiatives taken by global firms for sustainable development, 116 - 118research gap and relevance of study, 108-110 sustainable consumption and 4R, 118 triple bottom line approach to sustainability, 118-120 Sustainable energy technologies, 127 Sustainable hydrogen production methods, 185 Sustainable materials, 135 Sustainable mobility challenges of urban mobility, 162 - 165Delhi Metro, 169-171 ITS, 168-169 literature review, 161–165 practical implications, 171-172 rail-based MRTS, 169 real case studies, 164-165 research methodology, 165-166 results, 166-171 smart cities. 162 smart technology and smart mobility, 166–168 smart urban mobility, 162 Sustainable outcome, 61 Sustainable product design, 87

Sustainable transportation, 130, 188, 274 Sustainable urban development project, 29 Sustainable urban mobility, 195–197 challenges facing in, 207-208 initiatives, 208 key initiatives of smart city technologies for, 199 merits of sustainable urban mobility in smart city, 197-198 Sustainable urban transportation, 208 Suzhou, China, PPP model in, 67 - 68SWOT analysis, 42 of HCMC in implementing CE, 34-42 opportunity, 39-41 strength, 34-37 threats, 41-42 weaknesses, 37-39 Take-back programs, 36 'Take-make-dispose' model, 59 - 60Technical barriers, 184–185 Technological innovations, 77 Technological revolution, 2-3 Technology, 99 Teleportation, 261-262 Thematic analysis, 149–150 Thematic map, 153 Toda-Yamamoto method, 239 to Granger non-causality, 243 Tomra Systems, 90 Tourism sector, 37 Toyota, 179 Transport, 171 Transportation networks, 85 Transportation system, 206-207 reduction of air pollution by efficient, 170 Triple bottom line theory, 120 approach to people, 118-119

approach to planet, 119-120 approach to profit, 120 to sustainability, 118-120 UN environment programme, 165 Unit root, 245-247 United Nations Development Programme (UNDP), 50 United Nations Framework Convention on Climate Change (UNFCCC), 126 United Nations' Principles of Responsible Investment (UNPRI), 115 United Nations' sustainable development goals (SDGs), 18-19, 50, 109, 194 as entrepreneurial objectives, 117 - 118Urban context, CE in, 74 Urban development, 255 Urban energy management, 227 Urban environment, 139-140 'Urban Mining' programme, 30 Urban mobility, 170-171, 267-268 autonomous vehicles revolutionizing, 202-203 challenges of, 162-165 Urban planning, 265 Urbanization, 152, 162-163, 236 - 237Value added tax (VAT), 222–223 Value creation, 24-25 Vector autoregressive model (VAR model), 242 Vehicle-to-everything communications (V2X communications), 206-207 Vietnam. 236 ARDL bounds approach, 242 causality analysis, 248-253 cointegration analysis, 247 data, 243-244 estimations, 243-253

literature review, 237–240 long-run and short-run results, 247–248 methodology, 240–243 model, 240–243 policy implications, 255–256 Toda–Yamamoto approach to Granger non-causality, 243 unit root and structural break tests, 245–247 Vietnamese government, 39–40 Virtual mobility(*see also* Urban mobility), 268–269 Virtual reality (VR), 265 Waste management, 194–195 Waste reduction, 84, 87 strategies, 84 Well-being, 2–3 profound impact on, 3–4 Wind power, 133 Wireless sensor networks (WSNs), 200 for ITS, 205–206

Zen Robotics, 90, 216

'ZenRobotics Recycler' project, 87-88

Zero Waste, 11-12

Zero Waste and Resource Circulation Plan, 25–26, 31