The Role of Green Society in Society 5.0: Tango Diamond in a Collective Intelligence (Hybrid) Ecosystem Founded on Human-Centricity and Sustainability

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Abstract

The research composition sets out to extend and deepen the extant theoretical fund with a holistic perspective of the role of green society within the framework of Society 5.0. The purpose of the article is to move forward with tango diamond in a Collective Intelligence (Hybrid) Ecosystem concept and model, founded on human-centricity, sustainability and long-term prosperity and well-being. The study opted for a research method that is grounded on a systematic literature review approach, by utilizing a five-stage review process, taking into account the conceptual nature of the article. The research results signify that the role of green society goes beyond the traditional understanding of society and requires a notable transformation towards the desired effects of human-centric society doctrines. The innovative green society within Society 5.0 is substantial and multifaceted. The holistic sight of the contribution of green society goals and principles of a human-centric society is systematically depicted in the study, by pointing out that the framework is far more than a pattern and goes beyond conventional prospects, towards the development of a highly smart and healthy society and world. The research can make significant contributions to advancing understanding of green society, and the transition to a more equitable, healthy, sustainable and resilient future. The work may influence academic discourse, policy debates, and practical initiatives aimed at promoting sustainability and addressing global "green" and humanity challenges. The paper may contribute to all stakeholders interested in developing and implementing a healthy green society in a healthy human-centric society by approaching inclusive collaboration in a connected world and encouraging open innovation in managing change.

Keywords

Green Society, Society 5.0, Collective Intelligence (Hybrid) Ecosystem, Human-Centricity, Sustainability

"Study nature, love nature, stay close to nature. It will never fail you"
Frank Lloyd Wright

Introduction

The previous century had well shaped today's landscape that shakes the world and humanity and rides waves towards a new world order at an increased pace. Compelled by political, economic and market fragmentation, volatility, uncertainty and acceleration, the world nowadays is characterized by eclectic shifts and myriad challenges that are of transnational concern for countries worldwide. The generative issues evolved, resulting in a crisis that often implies far-reaching health, wealth, prosperity, well-being and sustainability concerns for humanity, humans, the environment, businesses, economies and organizations at a global scale. The imposed concerns exceed the country's boundaries and need compelling management of all related concerns founded on transnational cross-country and trans-institutional open collaboration and mutual wisdom to fruitfully accomplish favourable outcomes (Kondratieff, 1926; Chesbrough, 2003; Tornjanski et al., 2021a; Fasnacht & Straube, 2023; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c).

The key recognized global challenges are not finite, but are inter-connected in basis, and as such illustrated in Table No. 1. (Carlsen, 2020; Kopnina, 2020; Taranov et al., 2020; Bak-Coleman et al., 2021; Coccia, 2021; Hobbs et al., 2021; Hung, 2021; Tornjanski et al., 2021b; Behnassi & El Haiba, 2022; Clapp et al., 2022; Fatoye et al., 2022; Lythreatis et al., 2022; UNESCO, 2022; Afjal, 2023; Bali, 2023; Jeronen, 2023; Maestas et al., 2023; Raihan, 2023; Stamm & Vorisek, 2023; Sullivan & Hickel, 2023; Rjili et al., 2023; Tornjanski et al., 2023a; Tan et al., 2023; Tornjanski et al., 2023b; Zlobina et al., 2023; Adamopoulos et al., 2024; Danasekaran, 2024; Satizábal-Alarcón et al., 2024):

Table 1. An overview of key recognized inter-connected, yet not finite, challenges worldwide

No.	The key challenge	The key characteristics
1	Poverty and inequality	Economic inequality within and among countries deepens social gaps and intensifies pressures, undermining sustainable development and healthy growth endeavours. Inequality at a global scale is of significant concern that should not be neglected, taking into account harmful effects on the stability of the global economic system;
2	Food security	Satisfying the growing demand for food sustainably and equitably is a tough challenge, aggravated by aspects including population growth, climate change, land degradation, water scarcity, and unequal or need

for entrance to resources and (new) markets. In addition, the globalized era and military conflicts may represent key drivers of food insecurity that influence territories beyond the battleground making the food crises even more visible than it was in the past decade. Food insecurity and crisis create systemic challenges, highlighting existing systemic deficiencies in international food security. Food insecurity and crisis reveal a lack of the capability and/or the intention of governments and/or belligerents to manage the significant challenges and lack of humanitarian aid efforts to reach people in need;

3	Climate change	Climate change represents substantial threats to human health, food security, water resources, ecosystems and biodiversity, while climatic variability continuously devalues global sustainability;
4	Global health and well-being	The COVID-19 pandemic has emphasised the interconnectedness of global health challenges and the need for open collaboration and synchronized responses to spreading disorders, as well as management of non-communicable diseases, access to healthcare system and public health infrastructure;
5	Human rights and violations	Breaches of human rights, including violence against children and women, discrimination, gender inequality, human trafficking, and limitations on autonomy of expression and community, remain pervasive worldwide, undermining stability, peace, safety, and social cohesion;
6	Migration and refugees	Compelled displacement due to economic hardship, conflict, persecution and environmental disasters resulted in a global refugee emergency, with millions of people pursuing asylum and resettlement in other countries. Managing the core causalities of migration and furnishing safeness and support for refugees are demanding challenges;
7	Biodiversity loss	The rapid downfall of biodiversity due to habitat devastation, climate change, overexploitation of natural resources, and invasive species jeopardise ecosystems, food security, and the condition of vital ecosystems such as clean air, water, and pollination;
8	Economic slowdown	Uncertainty continues to be of significant concern for the economies in the period to come. According to predictions, the global economy looks shaky and could weaken further over the next period. The clouds of uncertainty over the economic aspect have been an intense subject over the past years. Taking into account predictions with reference to the economic slowdown, the financial landscape remains tight and geopolitical pressures and shifts grow, resulting in volatility, a phenomenon that is likely to remain in the future;
9	Gender inequality	Gender inequalities continue to be present in all dimensions of economic and social aspects. The discrimination entrenched in sociable organisations (laws, social standards and patterns) is a fundamental driver of imbalance, and eternal gender gaps in employment, education, and health. The phenomenon slows down advancements with respect to a rights-based social shift.

		These particular forms of discrimination are frequently hidden. Poorly designed biased regulations, mindsets and stereotypes restrict the capability of females to contribute to society and the economy;
10	Unhealthy environment	Unhealthy environments are, among other concerns, soundly linked with harmful psychological distress and mental health;
11	Unsustainable education	Unsustainable education refers to a lack of feeding learners of all ages the evolved academic system with the vital knowledge, skills, values and mechanisms to manage connected transnational challenges, founded on a long-life learning paradigm. The present educational system does not provide an aligned effort to change society and care for the planet via learning. In addition, the poorly designed system often results in a deficiency of holistic education comprising the cognitive, socio-emotional and behavioural dimensions of wisdom;
12	The ageing population and rapidly falling birth rates	The ageing population negatively influence economic growth, job patterns and retirement, the course that families live, and the capability of governments and societies to furnish satisfactory resources for elder adults and the majority of chronic diseases and disability;
13	Digital incoherence	The unstable and poorly developed telecommunication infrastructure, unequal access to information and communication technologies, internet connectivity, and digital skills deepen economic and social imbalances, limiting prospects for schooling, employment, and participation in the digital economy. Digital incoherence further implies poor quality of life and unfordable human needs to facilitate daily life and to ensure business continuity for businesses and organizations;
14	Humanity	Humanity faces a multitude of challenges in the 21st century, as it was shown in the text above. Besides the listed key challenges that influence humankind, individual security in both physical and cyberspace, political instability, ethics in technology, wars and destabilization at all levels represent significant threats to humanity that need to be holistically regarded without any delays and handled appropriately at a global scale.

Source: Authors' synthesis and analysis of previously published research articles

On the horizon of the effective response to all global challenges, a sustainable and human-centric future is acknowledged as "the future", and in recent advancements of Society 5.0 (Keidanren, 2016) and Collective Intelligence (Hybrid) Ecosystem (Tornjanski et al., 2020). Under the umbrella of the bright vision developed for the long-run successfulness and well-being of all, there are fundamental similarities and differences between models that need to be comprehended well and taken into account for the healthy development of societies and noble, unbiased, resilient and sustainable future conceptualized for all. Key attributes that signify basic similarities and differences between the models are depicted in Table 2 (Tornjanski et al., 2023d):

Table 2. Human-centric models' fundamental features

Attribute	Society 5.0 (Keidanren, 2016)	Collective Intelligence (Hybrid) Ecosystem (Tornjanski et al., 2020)
Authorship	Keidanren – Japan Business Federation, Japan, 2016 (Keidanren, 2016);	Group of authors: Vesna Tornjanski, Ph.D., Mladen Čudanov, Ph.D., Sanja Marinković, Ph.D., Serbia, 2020 (Tornjanski et al., 2020);
Definition	"A human-centred society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space" (Keidanren, 2016; Tornjanski et al., 2020, p. 134; Tornjanski & Čudanov, 2021, p. 415; Tornjanski et al., 2023a, p. 22; Tornjanski et al., 2023b, p. 101; Tornjanski et al., 2023c, p. 65);	"An innovative approach that encompasses and encourages simultaneous development and growth of both, economies and societies by introducing a concept of deep integration of humans' and smart machines' cognitive and emotional intelligence and open innovation, thus by empowering collective intelligence for the long-term well-being and prosperity of different stakeholder groups in the ecosystem" (Tornjanski et al., 2020, p. 134; Tornjanski & Čudanov, 2021, p. 415; Tornjanski et al., 2023a, p. 22; Tornjanski et al., 2023b, p. 101; Tornjanski et al., 2023c, p. 65);
Vision	Innovative super-smart, human-centric and vibrant economic society with advanced vast prospects to reach new markets, improve the quality of life and promote social responsibility and sustainability (Keidanren, 2016; Fukuyama, 2018; Ferreira & Serpa, 2018; Shiroishi et al., 2018; Tornjanski et al., 2020; Japan Government, 2020; European Commission, 2021; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c);	Innovative advanced economies and human-centric society, founded on a collective intelligent and inclusive society to ensure long-term sustainability, prosperity and well-being in a noble and brighter future designed for all (Tornjanski et al., 2020; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c);
Main goal and key objectives	Sustainable and human-centric future with the primary objective of improving the quality of life and promoting social accountability and sustainability of all via a "super-smart society" (Keidanren, 2016; Fukuyama, 2018; Ferreira & Serpa,	Sustainable and human-centric future with the primary objective of developing and growing economies and societies, satisfying human needs, fostering healthier life and environment, equitability, resilience, prosperity, well-being and

	2018; Shiroishi et al., 2018; Tornjanski et al., 2020; Japan Government, 2020; European Commission, 2021; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c);	sustainability, and improving quality of life and working towards broadening healthful societies and the healthful evolution of civilizations (Tornjanski et al., 2020; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c);
Driven by	Technology, technological innovations from Industry 4.0, knowledge (Hasan & Sony, 2023);	Healthy heart, knowledge, healthy innovations that empower humans' and smart machines' cognitive and emotional intelligence up to the level that satisfies human needs (Tornjanski et al., 2023b);
Key components (wide and narrow)	Cyberspace and physical space, technological innovations from Industry 4.0 (Keidanren, 2016);	Physical space and virtual space, cognitive and emotional intelligence of humans, the cognitive and emotional intelligence of smart machines and open innovation, security and privacy, "cyber and real", and "people and things" (Tornjanski et al., 2020; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c);
Political-economic system	Democratic political system; No specified economic system (Hasan & Sony, 2023);	A new political-economic system is required that may satisfy a human-centric society conceptualized for all (Tornjanski et al., 2023b; Yang, 2018);
Official support by the authority	The Government of Japan; The European Commission;	No official support by the authority;
Change level Security, privacy and resilience	Transformation of the society; Indicatively supported as part of the disadvantages of Industry 4.0 (Keidanren, 2016);	Transformation of the society; Strong security, privacy and resilience are integral (core) elements of the model in both, physical and virtual spaces (Tornjanski et al., 2021a; Tornjanski et al., 2021b; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c);

Source: Authors' synthesis and analysis of previously published research articles

Narrowly viewed, the sustainable future has been recognized in a green society, representing a holistic vision that prioritizes social equity, environmental sustainability, and economic well-being in its values, patterns, and policies. Green society in this study represents a society consisting of all "green" elements such as green agriculture, green technology, green

healthcare, green energy, green economy, green organization, green construction, green innovations, green human resources, green finance and many others (e.g.: Yusoff et al., 2015; Alomoush & Alkhozahe, 2022; Mirčetić et al., 2022; Lee et al., 2023; Zhang & Yu, 2023; Faizi et al., 2024; Mahsina & Soewarno, 2024; Milojević et al., 2024; Podvin, 2024; Vargas-Hernández et al., 2024; Wang et al., 2024). The green society, founded on eclectic holism, embraces principles of ecological stewardship, preservation, and reliable consumption to construct a prosperous and resilient society that appreciates the boundaries of the natural surroundings. With that in mind, a green society can create a more unbiased, resilient, and harmonious world for current and forthcoming generations founded on human-centricity and sustainability.

Despite the relevancy of recognized key global challenges shown in Table 1 of the study on one hand and the effectiveness of a broad and narrow understanding of human-centricity and sustainability on the other, the existing theoretical fund has no evidence of the holistic view of the role of green society in human-centricity and sustainability concepts with a systematic overview of feasible solutions to the core global challenges depicted in the study. With that in mind, the article sets out to explore and shed more light on the holistic overview of the role of green society in the Society 5.0 concept and context. The purpose of the article is to move forward with tango diamond in a Collective Intelligence (Hybrid) Ecosystem model, founded on human-centricity, sustainability and long-term prosperity and well-being. The study heartily embraces recent advancements and forthcoming guidance to secure the most fitting wisdom of the endurable and vibrant future of humanity and the world grounded on holism doctrine, going forward towards a healthy human-centric civilisation viewed from the eye of green society.

Methodology

The concept of research methodology follows the analogy of the construct of Beckhard and Harris's change model which consists of three vital dimensions (Čudanov et al., 2019; Tornjanski et al., 2023a):

- Dissatisfaction with the status quo – the component represents the research problem characterisation of the study;
- Vision – the element equals to a sustainable future viewed from wide and narrow perspectives described in the study;
- First steps towards the preferred future state – the dimensions correspond to research results shown in the section hereafter.

The research method of the study is grounded on a secondary data collection method, taking into account the early thoughts in the holistic view of the research subject. A systematic literature review represents a core method for researchers in contemporary research, and in particular in challenging conceptual research subjects such as the role of green society in the framework of human-centricity and sustainability vision, concepts and models. The literature review approach opens a door to valuable insights into the latest and advanced theories, concepts, frameworks, trends, findings and practices in the area of research interest and ensures the research subject supplies a new, innovative perspective on the same topic (Senyo et al., 2019; Tornjanski et al., 2021b; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c).

The literature review research process consists of five stages, including (Senyo et al., 2019; Tornjanski et al., 2021b; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c):

- Research criteria definition;
- Exploration of appropriate theoretical funds using reliable databases;
- Selection of the literature according to the research subject;
- Literature study;
- Results and conclusions derivation.

The employed research process follows the tough and thorough method of determining, specifying, and reviewing appropriate literature from myriad academic databases. The research construct is created on the collected data characterized by validity, reliability and objectivity, implying sounder and deeper insight into the research problem founded on the role of green society in a human-centric and sustainable future. The methodological approach allows the expansion of existing knowledge and theories and deepens bolder wisdom of the contemporary shifts in the area of vibrant research curiosity of the green society, human-centricity and sustainability (Senyo et al., 2019; Tornjanski et al., 2021b; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c).

Results and Discussion

The vision, concepts and models of a sustainable and human-centric future inspired by an illuminated Society 5.0 (Keidanren, 2016) and the Collective Intelligence (Hybrid) Ecosystem (Tornjanski et al., 2020) have also needs to rethink the role of green society within the landscape shaped for all.

To this end, this section sheds more light on the holistic perspective of the role of green society in a society with an inclusiveness that "leaves no one behind" (Fukuyama, 2018) systematically interpreted from three distinctive perspectives:

- The overall role of a green society within the concepts of Society 5.0 and Collective Intelligence (Hybrid) Ecosystem as an inclusive component of a human-centric future (shown in Table 3);
- The more specific role of green society in achieving the Sustainable Development Goals (hereafter: SDGs) as a comprehensive response to key global challenges in a composition of the sustainability system charted by the United Nations (UN, 2015) (depicted in Table 4);
- The hearty strategies required to be carried out towards accomplishing a human-centric and sustainable prospective world (displayed at the end of this section).

A green society concept's foundations lie in priorities of social equity, environmental sustainability and economic prosperity and well-being in its values, policies and approaches. It embraces doctrines of ecological stewardship, conservation, and reliable consumption to develop a harmonious, prosperous and resilient society that admires the boundaries of the natural environment and resources. With that in mind, the overall role of a green society in a human-centric society, i.e. in Society 5.0 (Keidanren, 2016) and Collective Intelligence (Hybrid)

Ecosystem (Tornjanski et al., 2020) is substantial and multifaced. To comprehend the inclusiveness of the green society in the human-centric models, Table 3 portrays the overall key roles and their effectiveness in contributing to the pursuits and principles of the human-centric society (Chesbrough, 2003; Keidanren, 2016; Fukuyama, 2018; Tornjanski et al., 2020; Nurdoğan & Arıöz, 2022; Kirchherr et al., 2023; Uralovich et al., 2023; Ghosh, 2024; Karthick Raghunath et al., 2024):

Table 3. The overall role of green society within the vision of a human-centric society

The overall role of green society	Characterization of the overall green society's role within the human-centric framework
Quality of life	A green society enriches the quality of life of all by embrasing pure air and water, access to clean nature, and healthy living settings. It prioritizes well-being, public health and cognitive and physical wellness via sustainable urban vision and planning, green physical spaces, and dynamic transportation possibilities;
Human-centric design	A green society emphasizes human-centric design doctrines in all green elements, including the development and deployment of green technologies, ensuring that innovations are scheduled to satisfy the needs of human beings and improve human prosperity and well-being. It prioritizes inclusive design, comfortable and secured accessibility, and human-centred techniques to construct technology solutions that benefit society for all;
Social equity and open inclusion	A green society boosts social equity and open inclusion by managing dissimilarities in all "green" areas, including entrance to healthy resources, environmental benefits and green opportunities. It advances environmental justice, participatory decision-making, and unbiased allocation of environmental resources to ensure that all people and societies can flourish;
Society participation, engagement, empowerment and cohesion	A green society fosters society engagement and participation in human-centric society development, empowering citizens to actively contribute to decision-making processes, governance structures, sustainable development initiatives, and co-create sustainable solutions. It promotes citizens' and science initiatives, participatory planning approaches, and community-based projects that harness local knowledge and expertise for sustainability, based on diverse perspectives, (local) knowledge, and grassroots efforts, enabling people to have a voice in shaping their societies and futures. Thus, a green society strengthens society cohesion and social capital by promoting relationships among people, encouraging a sense of belonging, and stimulating collective action for sustainability. It encourages open collaboration, teamwork, and mutual support among society members to manage shared challenges and achieve shared goals;
Global citizenship and solidarity	A green society welcomes a sense of global citizenship and solidarity, recognising a deep need for interconnectedness with people and ecosystems around the world. It fosters global collaboration, partnership development, solidarity, and collective effort to discourse global challenges as shown in Table 1 of the study;
Resilience and adaptation	A green society constructs resilience and adaptive capability to cope with environmental, social, and economic challenges, such as natural disasters,

	climate change and economic shocks. A green society stimulates community-based resilience strategies, resource management approaches and sustainable livelihoods to enhance readiness and recovery within an acceptable risk and desired continuity patterns;
Green, smart and sustainable infrastructure	A green society promotes the development of green, smart and sustainable infrastructure that leverages technologies to enhance efficiency, effectiveness, resilience, and environmental performance. It soundly emphasises the development of smart and secured infrastructure by integrating digital technologies from Industry 4.0 to improve efficiency, and effectiveness and boost comfortable connectivity. A green society champions the incorporation of green infrastructure principles and sustains the deployment of renewable energy systems, smart grids, green buildings, and sustainable transportation networks to assemble a low-carbon and resource-efficient built environment, aiming at not just optimizing resource usage but also minimizing negative environmental effects;
Collaborative governance, policy innovation and innovation management	Human-centric society vibrantly fosters open collaboration, within a country and cross-country networks, between diverse stakeholders such as academia, government, business, industry, organizations, and civil society in multi-stakeholder partnerships to assemble policy enhancements, integrated strategies, regulations, and encouragements that promote environmental sustainability, social inclusion, and economic prosperity. Collaborative governance and policy innovation advance sustainability goals in a human-centric framework and manage tough societal and other corresponding challenges. A green society encourages innovation management in all phases of a green society's life cycles (e.g. green agriculture, green healthcare, green organization, green technologies), leveraging the collective wisdom, knowledge, and resources of various stakeholders;
Environmental sustainability integration	A green society plays a prominent role in a human-centric society in two noteworthy ways when environmental sustainability is in question. A green society facilitates the management of environmentally sustainable patterns and technologies, such as renewable energy, energy-efficient infrastructure, and sustainable resource management. Prioritizing eco-friendly solutions enables the mitigation of environmental degradation and reduces the ecological footprint of society. A green society integrates sustainability doctrines into technological innovation and social evolution. It ensures that technological advancements prioritize environmental sustainability, resource efficiency, and resilience to mitigate environmental crashes and promote sustainable development;
Environmental monitoring and resilience	Environmental monitoring and resilience imply investments in environmental monitoring systems and resilience strategies to accurately predict and adequately respond to environmental disasters and threats in a human-centric society. It leverages satellite imagery, sensor networks and real-time data analytics to monitor environmental conditions, detect premature sign manifestations, and implement dynamic and adaptive measures for resilience;

Environmental education, public awareness and long-life learning	A green society establishes inclusive environmental education and public awareness, prioritizing education and lifelong learning opportunities that promote environmental literacy, sustainability, and responsible citizenship. It provides access to quality education, environmental education, and long-life learning opportunities that empower individuals with knowledge and skills to navigate sustainability issues, thus ensuring that citizens are quality educated, well informed and empowered to invest efforts towards sustainable future development. Environmental education and awareness promote environmental and digital literacy, and STEM education supplies people with the knowledge and skills towards favourable change. Advancement of environmental literacy and the fostering of a culture of sustainability, societies and individuals can make effective decisions and inclusively contribute to the transition towards a more resilient, innovative and collaborative society;
Cultural heritage and diversity	A green society honours cultural legacy, variety, and indigenous wisdom as valuable assets that contribute to human prosperity, well-being and resilience. On this basis, it appreciates cultural rights, practices, and exercises that upgrade harmony with nature and stewardship of natural resources, fostering cultural resilience and uniqueness;
Ethical consumption and production	A green society fosters ethical consumption and production designs that prioritize fairness, responsibility and sustainability. It facilitates mindful sustainable lifestyles, consumer preferences and ethical business practices that minimize environmental hit and elevate social fairness throughout the supply chain;
Data-driven environmental management and solutions	A green society harnesses the power of data and analytics to design data-driven environmental solutions and disclose decision-making for sustainability. State-of-the-art technologies such as big data, IoT, remote sensing, and predictive analytics, feed worthwhile wisdom into environmental requirements and tendencies, to monitor environmental indicators, assess ecosystem health, and identify opportunities for conservation and restoration. Thus, a green society employs these technologies to observe and manage natural resources, track pollution levels, and enforce evidence-based environmental policies and initiatives;
Circular economy and resource management	A green society encourages the adoption of circular economy principles and sustainable resource management practices as well as the shift to a circular economy, to minimize waste and maximize resource efficiency, by reusing, recycling, and repurposing. By embracing circular economy declarations, a human-centric society can lower dependence on limited resources and build a more promising sustainable and resilient economic system;
Sustainable consumption and production	A green society promotes sustainable consumption and production patterns in a human-centric society, enabling trustworthy consumption preferences and sustainable lifestyles. It champions the adoption of collaborative consumption practices, sharing economy models and eco-friendly creations

	that minimize negative environmental outcomes and glorify resource efficiency;
Economic prosperity and opportunities	A green society elevates inclusive and healthy economic development, worthy work, and sustainable livelihoods that sustain human evolution and well-being. It supports various economic initiatives such as social enterprises, green businesses and sustainable tourism endeavours that create employment patterns and opportunities, generate income, and contribute to local economies while protecting natural ecosystems;

Source: Authors' synthesis and analysis of previously published research articles

Taking into account the introduced results in Table 3, a green society plays a vigorous overall role in shaping the course of a human-centric society towards a more harmonious, inclusive, open, sustainable, equitable, resilient and economically prosperous future in which innovative technologies are harnessed to enrich human prosperity and well-being while protecting the planet for present and future generations.

Another perspective refers to the more specific role of green society in achieving the SDGs as a comprehensive response to key global challenges in the composition of the sustainability system outlined by the United Nations. Achieving the SDGs with a green society implicates aligning efforts to encourage environmental sustainability with the broader timetable of sustainable development drafted by the United Nations. The SDGs provide a wide pattern for managing global challenges, including poverty, food security, sustainable agriculture, healthy lives, prosperity and well-being for all at all ages, equitable quality education and promotion of long-life learning opportunities for all, gender and economic inequalities, climate change, environmental degradation, peace, and justice (UN, 2015). The results of green society's contribution as a response to key recognized global challenges viewed from the eye of SDGs are illustrated in Table 4 (e.g.: Chesbrough, 2003; Pimbert, 2009; Vyas & Mehta, 2015; UN, 2015; Fukuyama, 2018; Betz (Ed.), 2019; Tornjanski et al., 2020; Viliani & Winkler, 2020; Coccia, 2021; Gerber & Hinkelmann, (Eds.) 2021; Tornjanski & Čudanov, 2021; Tornjanski et al., 2021a; Almeida et al., 2022; Yalouli & Othman, 2022; Afjal, 2023; Araújo-Vila et al., 2023; Hamidon & Ahamed, 2023; Hasan & Sony, 2023; Kwilinski et al., 2023; Machado & Davim, (Eds.), 2023; Todorović & Obradović, 2023; Tornjanski et al., 2023c; Tornjanski et al., 2023d; Adamopoulos et al., 2024; Asim et al., 2024; Ghobakhloo et al., 2024; Keesstra et al., 2024; Mahsina & Soewarno, 2024; Sadiq et al., 2024):

Table 4. The specific role of green society in achieving the SDGs as a comprehensive response to global challenges in a pattern of the sustainability system drafted by the United Nations

SDG Goal (UN, 2015, p. 14)	The role of green society in achieving the SDGs
"End poverty in all its forms everywhere"	A green society broadcasts endurable livelihoods, economic opportunities, and social inclusion, helping to lower deprivation and inequality. Green society through „green initiatives" can construct a healthy foundation for economic opportunities, particularly in areas that comprise green businesses, fair trade practices, and community development initiatives including sustainable agriculture, sustainable and

	renewable energy, eco-tourism and other related. These pathways aim to raise humans' prosperity, well-being and lives out of poverty while strengthening environmental sustainability at the same time;
"End hunger, achieve food security and improved nutrition and promote sustainable agriculture"	A green society promotes sustainable agriculture, i.e. food security and food sovereignty by strongly encouraging smallholder farmers, agroecological approaches, and local food systems. Sustainable agriculture approaches can strengthen open innovations in agriculture, promote inclusiveness of more prominent involvement of citizens in formulating approaches, guidelines and policies for food, develop resilient food systems based on agroecology, organic farming, eco-literacy and food waste, create the basis for (new) markets, provide more equitable access to nutritious and culturally appropriate food for all and resource use rights, promoting biodiversity conservation and contributing to ending hunger while ensuring access to food for all and developing a healthier society;
"Ensure healthy lives and promote well-being for all at all ages"	Healthy lives and boosting well-being for all at all ages imply elementary components such as a healthy, clean environment, access to clean air and water, lowering air pollution and active lifestyles. These underlying elements contribute to increasing public health effects and decreasing the burden of diseases while addressing environmental determinants of health such as pollution and climate change and encouraging the long-term well-being of all;
"Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all"	A green society invests in environmental education, lifelong learning, and sustainable development literacy to empower individuals and communities with knowledge and skills for sustainability. Environmental education and awareness programs cultivate more in-depth wisdom of sustainability issues among scholars and communities, empowering them to carry out efforts and contribute to reaching other SDGs within the sustainability system developed by the United Nations. Thus, it enables education for sustainable development (hereafter: ESD) in schools, universities, and societies to cultivate environmental awareness and motion. In addition, the development and advancements towards effective and human-oriented communication within a construct of a mixture of communication skills such as discussion, listening in conversation, improvements in oral and written communication, proper usage of social media, and mutual respect should not be neglected within a sustainable framework. The educational communication framework conveys a worthwhile asset for societies when fostering the adoption of human-centric and sustainable innovations into real-life practice;
"Achieve gender equality and empower all women and girls"	Green initiatives can encourage gender equality by feeding women with equivalent entrance to education, resources, economic prospects and decision-making. It encourages women's leadership in environmental conservation, climate action, sustainable development initiatives, and sustainable sectors, by empowering them as agents of change;
"Ensure availability and sustainable	A green society encourages water conservation, water quality protection, and access to clean and safe drinking water for all. It endorses sustainable

management of water and sanitation for all"	water management approaches, wastewater treatment, and watershed security endeavours to assure equitable access to water resources. The availability and sustainability of water and sanitation for all can be achieved via investments in water infrastructure, watershed management, and pollution control measures to enhance access to clean water and sanitation services, assuring the sustainable governance of healthy water resources;
"Ensure access to affordable, reliable, sustainable and modern energy for all"	A green society advances the shift to energy efficiency, renewable energy and access to inexpensive and clean energy for all. Shifting to renewable energy sources, e.g., wind, solar, and hydroelectric power reduces unhealthy emissions, improves energy entrance, and contributes to acquiring universal access to affordable and pure energy. Renewable energy sources promote decentralized energy solutions, off-grid renewables, and community-owned energy projects to expand access to clean energy services while reducing carbon emissions;
"Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all"	A green society fosters sustainable economic growth, decent work, and green jobs by promoting sustainable business practices, green entrepreneurship, and inclusive economic development. It supports green industries, innovation, and investments in sustainable infrastructure and technologies. Green jobs in areas such as energy efficiency, renewable energy, waste management, and preservation design employment opportunities while stimulating sustainable economic growth and innovation;
"Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation"	A green society promotes sustainable industrialization, innovation, and infrastructure development that appreciates planetary boundaries and contributes to social and environmental well-being. Investments in sustainable industrial practices, green technologies, and green infrastructure, drive innovation, improve resource efficiency, and boost sustainable industrialization and infrastructure evolution. It sustains green technologies, circular economy approaches, and resilient infrastructure assignments that minimize environmental crashes and promote inclusive growth;
"Reduce inequality within and among countries"	A green society addresses social and economic inequalities and promotes inclusion by guaranteeing equitable access to resources, opportunities, and services. It champions environmental arbitration, participatory decision-making, and approaches which lower differences in income, wealth, and access to environmental benefits;
"Make cities and human settlements inclusive, safe, resilient and sustainable"	A green society promotes sustainable urban development, resilient infrastructure, and inclusive, safe, and sustainable cities and communities. Green urban planning according to the sustainable vision, compact, walkable, and green cities, sustainable transportation systems, green building design, green spaces and affordable housing that enhance quality of life and reduce environmental impact, encourage comfortable and resilient cities and communities, improving quality of life and lowering environmental blows;

"Ensure sustainable consumption and production patterns"	A green society promotes sustainable consumption and production patterns that minimize waste, pollution, and resource depletion. Promoting sustainable consumption and production patterns, such as reducing waste, recycling, and adopting circular economy practices, minimizes environmental footprint and supports sustainable development;
"Take urgent action to combat climate change and its impacts"	A green society contributes to climate action by reducing unhealthy emissions, improving resilience to climate effects, and shifting to a low-carbon economy. Green initiatives play a significant role in mitigating climate change impacts and promoting adaptation measures. It supports renewable energy, energy efficiency, sustainable transportation, forest conservation, and climate adaptation measures to mitigate climate change and its impacts;
"Conserve and sustainably use the oceans, seas and marine resources for sustainable development"	A green society advances marine protection, sustainable fisheries, and the conservation of marine ecosystems and biodiversity. It addresses marine pollution, overfishing, and habitat destruction through marine protected areas, sustainable fishing practices, and pollution prevention efforts;
"Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss"	A green society facilitates sustainable land management, terrestrial conservation and restoration of ecosystems and biodiversity. It safeguards forests, wetlands, and other crucial habitats, restores degraded lands, and advocates sustainable agriculture and agroforestry approaches to defend biodiversity and ecosystem services;
"Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels"	A green society fosters harmony, justice, and powerful institutions by encouraging environmental governance, the rule of law, and participatory decision-making approaches. It advocates for environmental rights, access to justice, and transparency in environmental decision-making to secure unbiased and endurable evolution;

| "Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development" | A green society facilitates multi-stakeholder partnerships, open collaboration, and knowledge-sharing to accelerate advancement towards the SDGs. It engages academia, governments, businesses, industries, international and local organizations, and civil society in joint efforts to manage tough sustainability challenges and achieve collective wisdom; |

Source: Authors' synthesis and analysis of previously published research articles

The SDGs provide a global framework for handling exhorting environmental, social, and economic challenges and building a more sustainable and equitable world by 2030 (UN, 2015). A green society plays a crucial and pivotal role in advancing the SDGs by embracing principles of environmental sustainability, social equity, and economic prosperity by promoting sustainability, resilience, and equity across environmental, social, and economic dimensions, and fostering a culture of responsible stewardship and global citizenship. By integrating environmental sustainability into all aspects of development, a green society can contribute significantly to the achievement of the SDGs, fostering a more equitable, resilient, and sustainable future for present and future generations.

However, taking into account that humanity is exposed to myriad pervasive threats that cannot be purposive and inscribed to thriving developments by any government, institution, organization or group of individuals performing as a disconnected closed system or in a vacuum (Tornjanski & Čudanov, 2021), the research results depicted in Table 3 and Table 4 suggest that the human-centric and sustainable future should be understood and directed towards integration of the fundamental features of Society 5.0 and Collective Intelligence (Hybrid) Ecosystem models to minimize possible creation of "new" social-cracks and marginalized groups of people around the globe. With that in mind, the results reveal the need for shifting focus from the SDGs blueprint to HSDGs wisdom, emphasizing "H" as a vital Humanity component of sustainability principles for genuine long-term prosperity and well-being of all in the vision fashioned for all.

Shifting from Sustainable Development Goals (SDGs) to Humanity Sustainable Development Goals (HSDGs) would likely involve a more comprehensive and integrated approach to development that prioritizes not just environmental, social sustainability and economic progress but also the well-being and flourishing of humanity as a whole. While the SDGs already encompass a wide range of social, economic, and environmental objectives, the concept of HSDGs could potentially emphasize certain aspects more prominently. For example, human well-being and flourishing, equity and social justice, peace and security (Kravets et al., 2021), cultural and spiritual dimensions, ethical consideration, resilience and adaption and long-term sustainability. Ultimately, the transition from SDGs to HSDGs would require broad consensus and partnership among governments, international organizations, civil society, and other stakeholders. It would involve reevaluating existing development frameworks, setting new priorities, and integrating a more holistic understanding of human well-being and flourishing into policy and practice.

In addition, the development and advancements towards healthy, effective and human-oriented communication within a construct of a mixture of communication skills such as discussion, listening in conversation, improvements in verbal and written communication, proper

usage of social media, and mutual respect should not be neglected within a sustainable framework. The educational communication framework conveys a worthwhile asset for societies when fostering the adoption of human-centric and sustainable innovations into real-life practice.

Finally, achieving long-term sustainability, well-being, and prosperity with the green society concept requires a holistic approach that integrates humankind, social equity, environmental stewardship and economic development. The key strategies needed to be taken into account to achieve these goals are as follows:

1. Integration of "H" - humanity component in the SDGs and shift from SDG to HSDG wisdom;
2. Integration of humanity and sustainability into policy and governance;
3. Promotion of green infrastructure and sustainable development;
4. Promotion and extension of innovation and technology for humanity and sustainability;
5. Empowerment of communities and fostering social inclusion;
6. Promotion of sustainable consumption and production patterns;
7. Investments in quality education and capacity building;
8. Supporting green businesses and sustainable enterprises;
9. Enhancement of open collaboration and (strategic) partnerships within a country, between trans-national cross-country and trans-institutional networks;
10. Promotion of environmental justice and equity;
11. Resilience development to climate change and global challenges;

Through the development and adoption of human-centric and sustainable strategies and embracement of the principles of the green society concept, societies would be capable of achieving longstanding sustainability, well-being, and wealth for current and future generations while preserving humankind and the world. It directs a concerted effort and collective wisdom at all levels of society to transition towards a more human-centric, sustainable and resilient future.

Conclusion

The previous century shaped the world and humanity characterized by sharp political, economic and market fragmentation, volatility, uncertainty, acceleration and eclectic challenges that concern countries worldwide. The concerns resulted in a crisis that often implies far-reaching health, wealth, prosperity, well-being and sustainability issues for humanity and the world. With that in mind, this study was conceptualized to explore and enlighten the holistic outline of the role of green society within the frameworks of human-centricity and sustainability.

The study opted to conceptualize the study by following the analogy of the construct of Beckhard and Harris's change model (Čudanov et al., 2019; Tornjanski et al., 2023a). The research method is based on a methodical literature survey proposition, challenging the conceptual research subjects of the study such as the role of green society in the framework of human-centricity and sustainability vision, concepts and models. The literature review research process pursues a five-stage model (Senyo et al., 2019; Tornjanski et al., 2021b; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c). The research construct is assembled on the assembled data distinguished by validity, reliability and objectivity, pointing

sounder and more in-depth wisdom into the research problem. The applied methodological approach allows the expansion of existing knowledge and theories and deepens more thoughtful knowledge of the contemporary evolutions in the area of vibrant research curiosity of the green society, human-centricity and sustainability (Senyo et al., 2019; Tornjanski et al., 2021b; Tornjanski & Čudanov, 2021; Tornjanski et al., 2023a; Tornjanski et al., 2023b; Tornjanski et al., 2023c).

The research results signify that the role of green society goes beyond the traditional understanding of society and requires a notable transformation towards the desired effects of human-centric society doctrines. The innovative green society within Society 5.0 and the Collective Intelligence (Hybrid) Ecosystem is substantial and multifaceted. The holistic sight of the contribution of green society goals and principles of a human-centric society is systematically depicted from three distinctive perspectives:

- The overall role of a green society within the concepts of Society 5.0 and Collective Intelligence (Hybrid) Ecosystem as an inclusive component of a human-centric future (shown in Table 3);
- The more specific role of green society in achieving the Sustainable Development Goals (hereafter: SDGs) as a comprehensive response to key global challenges in a composition of the sustainability system framed by the United Nations (UN, 2015), (depicted in Table 4);
- The list of key green society strategies that needs to be taken into account to achieve desired outcomes of human-centricity and sustainability.

The research results shown in Table 3 signify that a green society plays a vibrant role in shaping a human-centric and sustainable future in which innovative technologies are harnessed to enhance human prosperity and well-being while protecting the planet for current and coming generations. When the research results detailed in Table 4 are in question, a green society has a crucial and pivotal role in advancing the SDGs. The study introduces, for the first time, the need for shifting focus from the SDGs blueprint to HSDGs wisdom, emphasizing "H" as a vital Humanity component of sustainability principles for genuine long-run advantages of all in the vision designed for all. Going from Sustainable Development Goals (SDGs) to Humanity Sustainable Development Goals (HSDGs) would probably implicate a more extensive and integrated approach to development that prioritizes not just environmental, social sustainability and economic progress but also the well-being and flourishing of humanity as a whole. The evolution of healthy, effective and human-oriented communication should not be neglected within a sustainable development framework. The educational communication patterns convey a fruitful asset for societies when stimulating the adoption of human-centric and sustainable innovations into real-life practice. Finally, the list of key strategies shown in the study discloses the necessity for the evolution and adoption of key guiding principles with the purpose of societies being competent in acquiring long-run sustainability, prosperity and well-being for present and coming generations while conserving humankind and the world. With that in mind, the introduced research results point out that the framework is far more than a pattern and goes beyond conventional prospects, towards the development of a highly smart and healthy society and world.

The research study includes constraints that need to be revealed. The major boundary refers to the employed research method that is founded on the systematic literature review approach.

Thus, future research should be established on the research method that engages qualitative and quantitative data collection to earn the crucial volume and deepness of the analysis yields (Săvoiu et al., 2023; Tornjanski et al., 2023c). However, the study can make significant contributions to advancing understanding of green society and the shift to a more equitable, healthy, resilient and sustainable future. The work may influence academic discourse, policy debates, and practical initiatives aimed at promoting sustainability and addressing global "green" and humanity challenges. The paper may contribute to all stakeholders interested in developing and implementing a healthy green society in a healthy human-centric society by approaching inclusive collaboration in a connected world and encouraging open innovation in managing change.

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