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Review Article

Risks and forecasts of global temperature increase and climate challenges: Insights from the 5th wave theory and Novak triangle

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Abstract: The global overheating of the earth leads to numerous direct and indirect consequences. Explicitly also financial and explicitly also those that will affect people's insurance and standard of living. The Prof. Doost Mohammadian's 5th wave theory and the Novak triangle show correlations and possible solutions for government action. **Purpose:** Recognizing the consequences of the global increase in temperature is one thing, drawing the right conclusions and measures with the aim of implementing them in the foreseeable future is another. The countries of this world must act—this paper is intended to help. **Design/methodology/approach:** The aim was to find out what risks and predictions are posed by the global increase in temperature. This paper uses qualitative and quantitative approaches to analyze the challenges in anthropogenic global overheating using the Novak Triangle and the fifth wave/tomorrow age theory. The study is based on a review of existing literature and case studies of countries introduced based on the Paris Agreement (2015). **Findings:** Most people have realized that man-made global overheating will have massive consequences worldwide. These consequences need to be made concrete, as well as changes in human behavior and policy frameworks. The paper deals with various consequences and thus risks that will also affect the insurance industry and shows dangers for the world population. Affected countries: All countries of this world will be affected because the overheating of the earth is a global effect. **Research/future/practical implications:** Yes, anthropogenic global overheating (trivialized by various opinion makers as climate change and dismissed as a fringe phenomenon) is the greatest challenge facing humanity in the 21st century. In summary, the ability to make money or reduce one's costs with BEVs/FCEVs may be the fastest accelerator for their adoption. This can best be achieved with simple "out-of-the-box" solutions that people implement themselves out of self-interest (see Novak Triangle). Implications of this paper for research include the need for further research on human behavior and the effectiveness of proposed solutions. Future implications of this paper include the importance of mitigating direct and indirect consequences of temperature rise and considering unpleasant facts in this regard. **Originality/value:** Currently, there are practically no scientific books that would present the overall context of the challenges around global temperature increase in correlation with direct and indirect consequences for people and the economy at a glance. Therefore, only current findings and scenarios can be described here. This paper contributes to the literature on economic and environmental consequences of Earth overheating by explaining the resulting challenges using the 5th wave theory. The paper proposes solutions to these challenges and includes case studies of countries discussing these issues. The paper provides valuable insights for policymakers, insurance industry representatives, and researchers working toward a sustainable environmental and climate future.

Keywords: global earth overheating; the 5th wave theory; 7PS model; Novak triangle-motivation/decision making for people to act

JEL CLASSIFICATION: D91, G22, Q01, Q50, Q52, Q54, Q56, Q57, R23

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1. What are the risks of rising temperatures?

This is not about any kind of climate change (which has always existed in the course of Earth's history) but about anthropogenic Earth overheating, its consequences and possible solutions.

1.1. Risks and impacts as a result of temperature increase

Possible risks and concrete effects on various areas are examined in more detail and are intended to illustrate the intensity of the global climatic consequences for the environment, the population as well as the economy.

1.1.1. Impacts on the environment, nature and the population

The key consequence of the increase in greenhouse gas concentrations is the associated increase in global average temperature. All of the following discussions of risks and impacts are the result of this anthropogenic temperature increase. The increased temperature thus causes a chain reaction. Probably the most visible and serious effect of the temperature rise is the melting of the global ice masses. The most frequently used image in this context and a symbol for the fatal consequences of the temperature rise is the polar bear. The famous photo of a single, half-starved polar bear floating on an obviously melting ice floe illustrates how serious the global climate is (for scientific reasons, the deeply emotional photo will not be shown here).

If the glaciers in the high mountains, as well as the ice masses in Greenland, the Arctic and the Antarctic melt, then the ability of the earth to reflect the short-wave incoming radiation of the sun (albedo effect) decreases and favors thereby a further advancement of the greenhouse effect, the warming and accordingly a further melting. Besides this effect as a reflector, the glaciers and ice masses have another essential importance for the population living there. The glaciers retain water in winter and release it to the local population through melting in the warmer months. Due to the retreat of the glaciers, some regions in the world will be dependent on humanitarian support in the future, as the glaciers there will no longer be needed as a drinking water supply. Potential examples of this would be the capital of Peru, which is located in the Andes, and the regions in the Himalayan Mountains. If the people there lose the glaciers as a drinking water supply, there will be acute and prolonged water shortages, especially in the summer months—a life-threatening situation for millions of people[1].

Back to the image of the desperate polar bear on the ice floe. Assuming continued retreat of Arctic ice, polar bears are getting further and further away from their food source, seals, and are starving or drowning as a result. As a result of the melting ice, numerous other animal species besides polar bears are losing their habitat or are threatened with extinction. The situation is similar for the local population, the Inuit, who would equally lose their habitat and thus also their livelihood. The consequence will be a flight or necessary resettlement (forced migration). On the other hand, if we consider the consequences of the melting continental ice sheets, which are located in Greenland and Antarctica, this will have serious consequences for the entire world population. If only the 3–4 km thick ice sheet melts, this will result in a sea level rise of 7 m. This scenario is quite possible, since according to scientific projections a temperature increase of only 3 °C compared to the average mean would result in a complete melting of the Greenland ice. Since the temperature in Antarctica is well below freezing, a temperature increase of a few degrees would not have such a fatal effect as on the Greenland ice. In Antarctica, therefore, it is not so much the temperature there that plays a decisive role, but rather the warmer temperatures of the seawater there. These now warmer water masses accelerate the

melting of the ice coming into contact with the water. Thus, if the Antarctic were to melt in addition to the Greenland ice, this would result in a sea level rise of another 57 m[1]. However, it is worth mentioning that this process of complete melting of the continental ice sheets would probably last several centuries (humanity must hope for this so that it has enough time for effective countermeasures).

If we stay in the colder regions of the earth, there is another consequence there that will have an immense impact on global warming. As colder regions warm up, the permafrost soils there warm up, leading to a release of CO_2 stored in the soil. Small microorganisms living in the soil decompose animal and plant remains and lead to an additional release of methane CH_4. Furthermore, the thawing of permafrost soils can cause rocks and boulders in the mountains to fall. This hazard would in turn put people and their habitat at risk[2]. The softening of permafrost soils would cause entire regions that have adapted their infrastructure to the conditions there to permanently sink into the newly formed mud.

As has now been pointed out, global temperature rise is causing ice sheets and glaciers to melt, resulting in a steady rise in sea level due to added water flow. Furthermore, warm water masses have a higher volume than cold water masses and thus expand more, which has an additional negative impact on sea level rise. Similar to the Inuits, hundreds of millions of people in coastal regions are losing their habitat due to sea level rise, resulting in the resettlement of large populations (forced and mass migration). Due to the decimated ice sheets and the increased sea level, the absorption of short-wave solar radiation increases, which further intensifies global warming.

One consequence resulting from the increased sea level to the warmed water is the disturbance of existing ocean currents. The sinking of enormous cold-water masses into deeper ocean regions in the European North Sea creates an undertow that directs warmer water from more southerly regions to the north. This redirection of warmer water causes the temperature in the North Atlantic region to rise, increasing the temperature in northern and western Europe by several degrees Celsius. Enormous amounts of fresh water enter the Atlantic Ocean through the ice that melts in Greenland, thereby reducing the salinity and density of seawater. This effect of weakening the density of seawater is further negatively influenced by the increasing sea temperature. The consequence of this density change of the seawater can lead to progressive climatic warming to a weakening and/or to a possible complete standstill of the North Atlantic current (note by the authors: Even if this would happen, it would not mean that it would come like with the film “The day after tomorrow” (2004), to an ice age. The effects of this are simply unknown and cannot be simulated realistically in laboratories).

Another disadvantage of the reduced density of seawater is the reduced ability to sequester CO_2. Along with the biospheres, the oceans represent one of the most important carbon reservoirs. In addition to cooling the temperature in parts of northern and western Europe, the reduced density of seawater may result in less water sinking in the North Atlantic and thus less CO_2 being sequestered. Conversely, this leads to an increasing rise in CO_2 concentration in the atmosphere and a further amplification of the greenhouse effect[1]. Nevertheless, this steady uptake of CO_2 by the oceans leads to increasing acidification and thus additionally affects the life of many organisms whose habitat is the oceans[3]. In addition, increased ocean temperature is likely the cause of increased weather extremes. This is presumably because the drawback of extreme weather events is that they are both infrequent and cannot be directly attributed to a single or precise cause (no singular causality). Thus, even if no scientifically confirmed single causal relationship (deterministic algorithm) can be drawn, it can be assumed with a high degree of probability that increasing anthropogenic climate warming favors or accelerates the occurrence of such extreme weather events. “Extreme weather events are primarily understood to be prolonged heat waves and droughts localized heavy rainfall, and tropical cyclones.”

In addition to these extreme weather events, the resulting consequences such as fires, hailstorms, floods and landslides can also be classified. Using tropical cyclones as an example, conclusions can be drawn that the energy content of storms and their destructive power is related to increased water temperature. Based on past climate data collected, a correlation between the increased number but especially the intensity/strength of hurricanes and the increase in water temperature, causally due to climate warming, can be surmised[1]. These assumptions are underscored by possible scenarios and climate models based on long-term data series.

Already now, the consequences of the Earth's overheating are partly visible and noticeable in people's lives. The increase in the global average temperature and the frequent occurrence of droughts and heat waves also have a direct impact on the health of the population. The following graph uses the example of the USA to illustrate increased mortality as a result of an increase in hot days.

Figure 1 illustrates critical climate change indicators, specifically focusing on the rise in heat-related deaths in the USA over the period from 1979 to 2018. The data, sourced from the United States Environmental Protection Agency, offers a visual representation of the alarming trend in heat-related fatalities. This graph serves as a stark reminder of the urgency to address climate change and its life-threatening consequences.

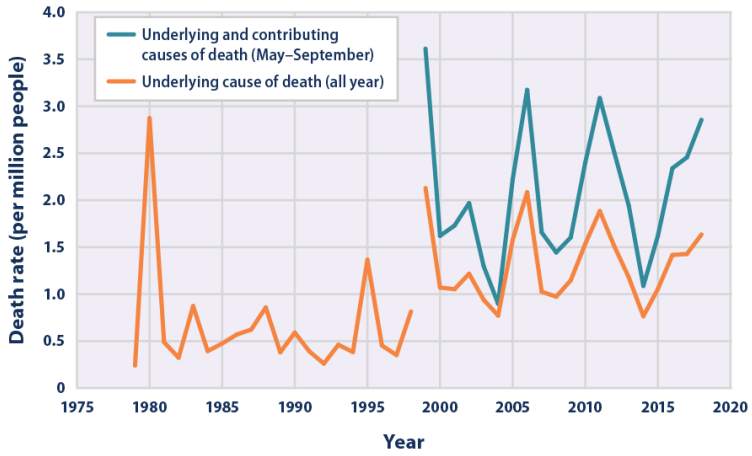

Figure 1. Climate change indicators: Heat-related deaths in the USA 1979–2018.
Source: United States Environmental Protection Agency, Homepage, N.N. (no date). Climate change indicators[4].

Another possible consequence on the health of the population may be the spread of diseases. As a result of climatic changes, insects that have so far only survived in permanently warm regions can spread and bring diseases to parts of the world where they have not previously been found at all due to the low temperature. However, numerous other factors depend on this aspect. In addition to the many consequences and impacts mentioned, agriculture faces a major challenge. While some northern regions will benefit from a rise in temperature, areas in subtropical latitudes, especially in Africa and Asia, will be very negatively affected by the rise in temperature. As a result, famines will be exacerbated in regions where they are already occurring, further widening the gap between developed and developing countries.

1.1.2. Impact on the global economy

Gross domestic product (GDP) is used as a metric to measure the impact of temperature rise on the global economy. Accordingly, with increased production of goods, GDP also increases and consequently the environment is affected more. In order to illustrate the financial losses on the GDP, projections of the GDP as well as different climate scenarios are used as a basis. It can be said at the outset that GDP will experience a decline of up to 45%, taking into account the scenario with the greatest impact on climate[3]. However, these are still projections and forecasts. No "price tag" can be placed on temperature increase with certainty.

Although the costs are difficult to calculate, the German Institute for Economic Research (DIW) has undertaken the task of quantifying the costs incurred for the Federal Republic of Germany. According to the study conducted, approximately 800 billion euros will be incurred over the next 50 years. Approximately half of this is attributable to direct climate damage, while the other half is made up of energy price increases and adjustments resulting from the rise in temperature[5]. Such projections seem very imaginary, but are especially valuable for policymakers and GHG taxation. "The direct and indirect cost of a ton of emitted CO_2 is estimated at US$30–40. So, with annual CO_2 emissions of 6.4 tons per capita, each citizen could be charged up to US$250"[5]. In addition to public infrastructure and agriculture, the tourism and insurance industries in particular will be hit hard by the rise in temperature. With the tourism industry directly dependent on climate and weather, adjustments will need to be made in terms of supply. Both primary insurers and reinsurers, who offer their customers' insurance coverage against certain risks, will clearly feel the effects of the increasing natural disasters and the resulting losses.

2. Forecasts of the progressive rise in temperature based on climate models and climate scenarios

An exact prediction of the temperature rise, its consequences and its effects on the environment, as well as the population and the economy, is not really possible as of 2023. With the help of various climate scenarios and models, the consequences resulting from a rise in temperature can be simulated. At the heart of these scenarios is the so-called Representative Concentration Pathway (RCP), which replaced the previous SRES scenarios (Special Report on Emissions Scenarios) in the IPCC's 5th Assessment Report. The most important scenarios are based on different greenhouse gas concentrations and radiative forcing, which can be used to simulate the future global temperature increase and its consequences up to the year 2100. A distinction is made between the following scenarios:

1) Scenario RCP 2.6 with an average global warming of a maximum of 2 °C,
2) Scenario RCP 4.5/6 with an average global warming of about 3 °C, and
3) Scenario RCP 8.5 with an average global warming of a maximum of 5 °C.

In the context of climate scenarios, a distinction is made between physical risks and transition risks. Physical risks are all those risks that can be derived from natural phenomena such as heat waves, droughts, heavy rainfall or storms due to the progressive rise in temperature. Physical risks have a medium- to long-term negative impact on the climate and its stability[3].

Transition risks include all those short- and medium-term measures that are necessary to contain the physical risks in the long term. Possible measures could be, for example, economic consequences due to the closure of CO_2-damaging industries. RCP 2.6 represents the optimistic case that global warming is limited to 1.5 °C–2.0 °C by the year 2100, as called for in the Paris Agreement (authors' note: This does not mean that only up to this maximum temperature increase will occur, but rather that a significantly higher temperature increase is expected in the meantime, followed by a decrease to 1.5–2 °C. as a result of numerous global measures). If this scenario occurs, strongly pronounced transition risks, as well as long-term physical risks occurring on a limited scale, are to be expected. The global and Germany-related projected GDP loss is then about 13%.

Under partial achievement of the specified targets of the Paris Agreement and the limitation of the temperature increase to a maximum of 3 °C, are presented in RCP 4.5/6. In this scenario, transition risks are minimized, while, on the other hand, both long-term physical risks and projected GDP losses increase to about 25% with respect to the global economy and about 23% with respect to Germany.

RCP 8.5 represents the (catastrophic) case in which none or only a few of the adopted climate protection measures are actually implemented, the temperature rises up to 5 °C and no relevant decrease in CO_2 emissions is evident until 2100. If this scenario occurs, there are hardly any transition risks due to the lack of measures to counteract climate protection. In contrast, the physical risks, just like the GDP loss, will be enormous. The global GDP loss will be ≥ 45%, while the loss for Germany will be about 40%. The GDP losses in the latter two models were chosen to be somewhat lower because the impact of the physical risks will hit Germany less than the global average[3].

3. Seven pillars of sustainability model (7PS)

The Seven Pillars of Sustainability (7PS) model, developed by Prof. Dr. Doost Mohammadian[6], is a comprehensive framework for achieving sustainability. the 7PS model emphasizes the importance of a holistic and integrated approach to sustainability that addresses multiple pillars simultaneously. By focusing on these seven key areas, the model provides a comprehensive framework for developing sustainable policies and practices that can support a transition toward a more sustainable and equitable future.

Doost Mohammadian's 7PS model, provides a holistic framework for comprehending the intricate challenges and opportunities linked to sustainable development. Illustrated in **Figures 2 and 3**, this model encompasses seven interconnected pillars, each addressing vital dimensions of human life and the environment. Based on fuzzy AHP analysis, the prioritization of these pillars is as follows:

1) Culture
2) Environment
3) Society
4) Economy
5) Technology
6) Education
7) Politics

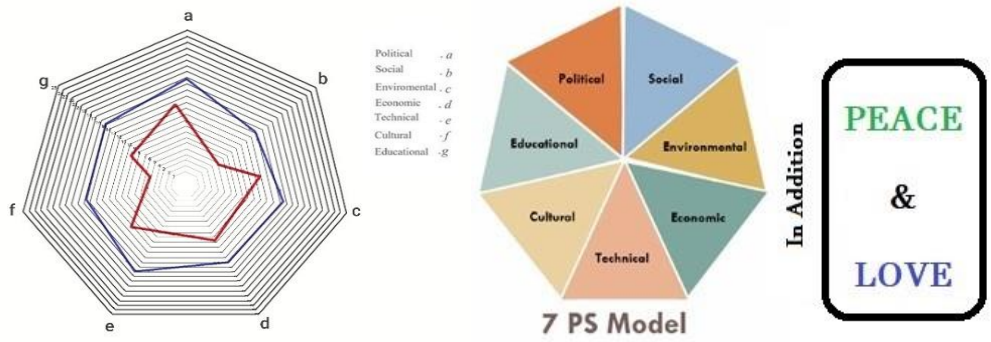

Figure 2. Seven pillars of sustainability (7PS) model[7].

These pillars offer a comprehensive framework for understanding and promoting sustainability across various domains, including sustainable water management and the transition to a blue-green, technologically innovative economy. When combined with the 5th wave and i-Sustainability Plus theories, the 7PS model underscores the interdependence of different aspects of human life and emphasizes the importance of a coordinated, long-term effort to achieve sustainability in the water sector. By identifying key areas of action, this model guides the development of policies and practices that ensure equitable access to water resources while safeguarding the natural environment to protect the people natural resources, ecology, decrease the global warming and global temperature increase.

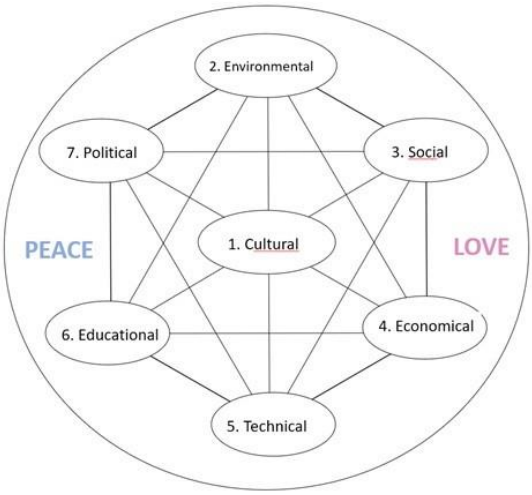

Figure 3. 7PS Model with the pillars' priority, connections & PEACE/LOVE[8].

7PS is a framework and main model as the foundation for the 5th wave theory, that provides a comprehensive approach to achieving sustainability. The model consists of seven interconnected pillars that address multiple dimensions of human life. The seven pillars are prioritized as below:

1) **Culture:** This pillar refers to the values, beliefs, and customs that shape human behavior and influence how individuals and communities interact with the environment. Culture plays a crucial role in shaping attitudes towards sustainability and can help promote sustainable practices and behaviors.

2) **Environment:** This pillar focuses on the natural systems and resources that support life on Earth, including air, water, land, and biodiversity. The environment pillar emphasizes the need to protect and restore natural ecosystems, reduce pollution and waste, and mitigate the impacts of climate change.

3) **Society:** This pillar recognizes the importance of social equity, inclusion, and diversity in achieving sustainability. It emphasizes the need to ensure that all individuals and communities have access to basic needs, such as clean water, food, and healthcare, and that social and environmental justice issues are addressed.

4) **Economy:** This pillar recognizes the importance of economic development in achieving sustainability. It emphasizes the need to promote sustainable economic growth, reduce resource consumption and waste, and promote circular economy principles.

5) **Technology:** This pillar recognizes the importance of innovation and technology in achieving sustainability. It emphasizes the need to promote sustainable technologies, such as renewable energy, energy-efficient buildings, and sustainable transportation, and to develop new technologies to address sustainability challenges.

6) **Education:** This pillar recognizes the importance of education and awareness in achieving sustainability. It emphasizes the need to promote education and awareness on sustainability issues, provide training and capacity building for sustainability professionals, and engage the public in sustainability initiatives.

7) **Politics:** This pillar recognizes the importance of political and institutional frameworks in achieving sustainability. It emphasizes the need to promote policies and regulations that support sustainability, promote international cooperation and partnerships, and promote transparency and accountability in decision-making.

In addition, **Peace**, and **Love**.

Additionally, the values of peace and love are considered fundamental principles of sustainable development. Peace refers to the absence of violence, conflict, and war, while love refers to the interconnectedness of all living beings and the need for compassion and empathy in our relationships with others and the environment. Incorporating these values into the 7PS model, it highlights the importance of

addressing social and cultural factors in achieving sustainability and creating a more peaceful and harmonious world. It is important to note that PEACE and LOVE are not dimensions of high sustainability, but rather values that can contribute to achieving high sustainability. PEACE refers to promoting peace, social justice, and conflict resolution, while LOVE refers to fostering compassion, empathy, and caring for others. These values can help create a more sustainable and equitable world, but they are not specific dimensions of sustainability.

The 7PS model provides a useful framework for understanding the complexity of sustainability and the need for a comprehensive approach that addresses multiple dimensions of human life.

The 7PS model, developed by Prof. Dr. Doost Mohammadian, provides a framework for achieving sustainability in various domains, including sustainable water management. In the context of a blue-green clean technologically innovative economy, the 7PS model can be applied through the 5th wave and i-Sustainability Plus theories.

Therefore, based on **Figures 2** and **3**, **Table 1** shows the prioritization resulting from the matrix of paired comparisons using the fuzzy AHP method for each of the alternatives. In the final ranking, culture has the first priority.

Table 1. Ranking of 7PS model indexes based on fuzzy AHP[8].

7PS model indicators	Source	Rank
Economic	0.324	4
Social	0.353	3
Environmental	0.382	2
Technical	0.251	5
Cultural	0.481	1
Educational	0.221	6
Political	0.175	7

The 7PS model, combined with the 5th wave and i-Sustainability Plus theories, provides a comprehensive framework for promoting sustainable water management practices. By addressing the interdependence of different areas of human life, the model emphasizes the need for a coordinated effort and a long-term perspective in achieving sustainability in the water sector. Applying the 7PS model to water management can help identify key areas of action and provide guidance for developing sustainable policies and practices that promote equitable access to water resources while protecting the natural environment.

4. The 5th wave theory and the global warming

Prof. Doost Mohammadian's 5th wave theory, also known as the tomorrow age theory or the theory of comprehensive everything, offers an intricate and all-encompassing framework that facilitates our:

1) Comprehension,
2) Prognostication,
3) Prevention, and
4) Confrontation

of the

1) Multifaceted challenges that beset the world today and
2) The crises that loom on the horizon.

This comprehensive paradigm equips us with a preeminent preparedness for the forthcoming sustainability challenges, crises, and apprehensions, particularly within the temporal realm stretching from 2020 to 2030.

This epoch represents the vanguard of tomorrow, endowing us with a profound understanding of the prospects intertwined with sustainable development. Within the forefront of these challenges and future crises, we now turn our attention to a profound analysis concerning the apprehensions surrounding the escalating global temperature, as depicted in **Figure 4**.

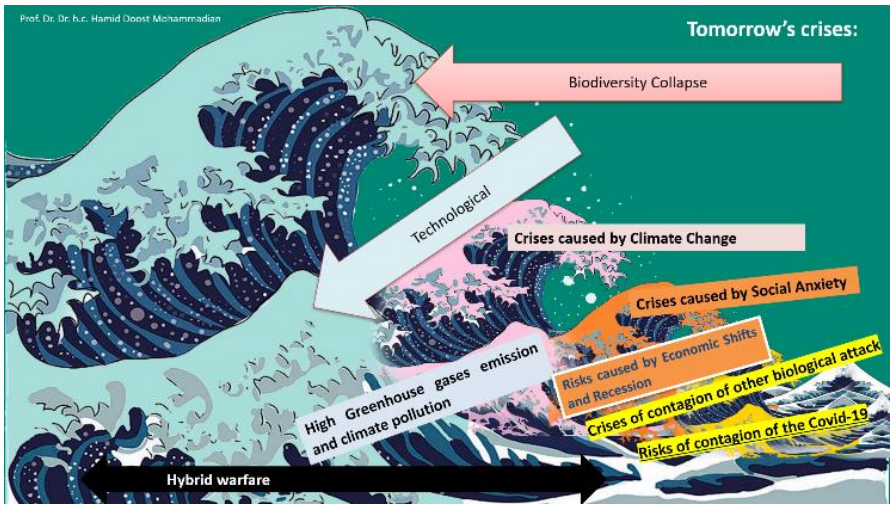

Figure 4. Tomorrow's crises waves at the edge of tomorrow[9].

1) **The peril of Covid-19 contagion:** The initial wave of concern pertains to the contagion of the infamous Covid-19 pandemic, a global conundrum that has served as a stark precursor to the ensuing challenges of our era.

2) **The crisis of biological contagion:** In the second wave, we confront the pernicious specter of contagion involving other biological threats, thus exemplifying the vulnerability of our interconnected world.

3) **Risks stemming from economic shifts and recession:** The third wave unfurls a host of risks stemming from dramatic economic shifts and the specter of recession, raising pertinent questions about global financial resilience.

4) **Crises brought forth by social anxiety:** In the fourth wave, we delve into crises germinating from pervasive social anxiety, a potent force that has far-reaching consequences for our collective mental and emotional well-being.

5) **Challenges posed by heightened greenhouse gas emissions and climate pollution:** The fifth wave ushers in challenges posed by the alarming increase in greenhouse gas emissions and climate pollution, underscoring the immediate imperative to curb environmental degradation.

6) **Crises emerging from climate change:** Within the sixth wave, we grapple with the cascading crises generated by the escalating specter of climate change, which is reshaping the global landscape with profound ecological disruptions.

7) **Crises induced by technological advancements:** The seventh wave shines a light on crises born of rapid technological advancements, inviting a profound scrutiny of our ability to harness the benefits while mitigating the risks.

8) **Ultimately, crises arising from biodiversity collapse:** The eighth and final wave brings us face to face with crises triggered by the alarming collapse of biodiversity, emphasizing the inextricable link between the health of our ecosystems and the prosperity of humanity.

The 5th wave theory, through its comprehensive analysis of these challenges and crises, offers invaluable insights into the daunting risks and forecasts surrounding the escalating global temperature. The road to a

sustainable future necessitates a deep understanding of these issues and a proactive approach to addressing them.

Prof. Doost Mohammadian's 5th wave theory can be applied to the risks and forecasts of the global temperature increase, which is a significant environmental crisis facing the world today. According to the theory, the global temperature increase can be seen as part of the larger crisis of climate change, which is characterized by a range of interconnected risks, including high greenhouse gas emissions, more frequent and severe natural disasters, water scarcity, and food insecurity. These risks are part of the Tomorrow's Crises Chain at the Edge of Tomorrow, and they are expected to have significant impacts on the world in the coming years. The global temperature increase is already having significant impacts, including rising sea levels, melting glaciers, and more frequent and severe heatwaves, droughts, and wildfires. These impacts are expected to worsen in the coming years, leading to further risks and challenges for society and the environment. To address these risks and achieve sustainable development, it is essential to develop comprehensive and integrated strategies and policies that can balance economic, environmental, and social priorities. This may involve a range of solutions, including transitioning to renewable energy sources, improving energy efficiency, promoting sustainable land use practices, and investing in climate adaptation and resilience. According to Prof. Doost Mohammadian's 5th wave theory, these crises are likely to occur in an interrelated manner and will require a coordinated, holistic approach to address them. The first edge of tomorrow, which is between 2020 and 2030, is a critical period in which these crises are likely to occur.

- The Covid-19 pandemic has already caused significant health, social, and economic impacts globally. The risk of the pandemic continues to be a major concern, as new variants of the virus emerge and vaccine distribution remains unequal.

- A biological attack, whether intentional or accidental, could cause widespread illness and death. The rapid spread of a deadly pathogen could have devastating consequences, and there is a need to be prepared for such a scenario.

- Economic shifts and recessions can have significant impacts on global markets, employment, and living standards. Economic downturns can be caused by a range of factors, including global trade tensions, rising debt levels, or technological disruption.

- Social anxiety and unrest can arise from a range of factors, including income inequality, political polarization, or demographic shifts. Social unrest can cause significant disruption and can be challenging to address.

- Greenhouse gas emissions continue to contribute to global warming and climate change, which have already had significant impacts on the environment and human health. Urgent action is needed to reduce greenhouse gas emissions and mitigate the effects of climate change.

- Climate change can have direct impacts, such as more frequent and severe natural disasters, water scarcity, or food insecurity. The effects of climate change are already being felt in many parts of the world, and urgent action is needed to mitigate these impacts.

- Technological advances bring significant benefits, but also pose risks, such as cyberattacks, artificial intelligence, or biotechnology. The risks associated with these technologies must be carefully managed to avoid unintended consequences.

- Biodiversity collapse could have significant ecological, social, and economic impacts. The rapid loss of biodiversity is already occurring, and urgent action is needed to prevent further losses.

The interrelated nature of these crises means that a coordinated, holistic approach is needed to address them effectively. The first edge of tomorrow is a critical period in which urgent action is needed to address these challenges and ensure a sustainable future. By adopting a holistic and coordinated approach, we can address the risks and challenges associated with the global temperature increase and ensure a sustainable future for generations to come.

According to the 5th wave/tomorrow age theory or theory of comprehensive everything on Risks and Forecasts of the Global Temperature Increase, the first edge of tomorrow between 2020 and 2030 is likely to be characterized by a series of interrelated crises. These crises are related to the impacts of global warming and climate change and will require a coordinated, holistic approach to address them.

The crises that are likely to occur at the first edge of tomorrow, based on Prof. Doost Mohammadian's research, are as follows:

1) **Extreme weather events:** As global temperatures continue to rise, extreme weather events such as hurricanes, typhoons, heatwaves, and droughts are likely to become more frequent and severe, leading to significant human and economic costs.

2) **Water scarcity and insecurity:** The changing climate is likely to impact water availability and quality, leading to water scarcity and insecurity, which can have profound social, economic, and environmental impacts.

3) **Food insecurity:** Climate change is likely to affect crop yields, leading to food insecurity, particularly in regions that rely heavily on agriculture.

4) **Biodiversity loss:** Climate change is expected to accelerate the rate of species extinction, leading to a loss of biodiversity, which can have significant ecological, social, and economic impacts.

5) **Economic instability:** The impacts of climate change, such as extreme weather events and food and water insecurity, can lead to economic instability, particularly in vulnerable regions.

6) **Migration and displacement:** Climate change is likely to lead to migration and displacement, as people move to escape the impacts of extreme weather events, water scarcity, and food insecurity.

7) **Conflict and political instability:** Climate change is likely to exacerbate existing political and social tensions, leading to conflict and political instability, particularly in regions that are already vulnerable.

These crises are likely to be interrelated and will require a coordinated, global response to mitigate their impacts and adapt to the changing climate.

The tomorrow's crises chain at the edge of tomorrow based on the 5th wave theory on risks and forecasts of the global temperature increase includes the following major crises, as depicted in **Figure 5**:

1) Contagion of Covid-19,
2) Health crisis (Mental and Physical),
3) Educational risks,
4) Economic risks,
5) Cultural risks,
6) Technological risks,
7) Risk of social anxiety includes providing welfare health medical and pharmaceutical services,
8) Environmental risks,
9) Political risks,
10) Risk of consequences events that never made public,
11) The other risks.

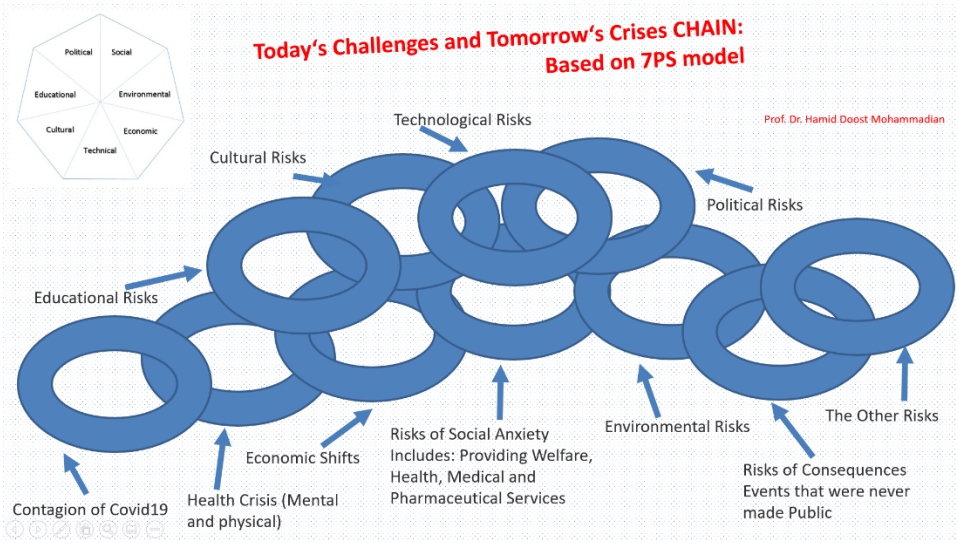

Figure 5. Tomorrow's crises chain at the edge of tomorrow[9].

At the precipice of the future, the incisive 5th wave theory offers us a profound insight into the inexorable chain of crises that looms on the horizon. These crises, epitomized in **Figure 5**, underscore a complex tapestry of challenges that beset humanity:

1) **Contagion of Covid-19:** An ongoing global pandemic casts a pervasive shadow, illuminating the need for resilient health systems and dynamic preparedness to confront contagious threats.

2) **Health crisis (mental and physical):** Beyond the realm of physical maladies, the burgeoning health crisis encompasses a broad spectrum, from the subtle yet pernicious scourge of mental health challenges to the exigencies of physical well-being.

3) **Educational risks:** The tectonic shifts in the education landscape, fueled by digitization and social disparities, engender multifarious educational risks that beckon astute strategies for equitable knowledge dissemination.

4) **Economic risks:** In a rapidly evolving global economy, the intricate nexus of economic perils underscores the need for adaptive strategies, fiscal prudence, and inclusive growth.

5) **Cultural risks:** The subtle and profound influences of cultural shifts on societies and civilizations call for the preservation of cultural diversity and the thoughtful navigation of these cultural risks.

6) **Technological risks:** In a hyper-connected world driven by cutting-edge technologies, the manifold technological risks demand vigilant oversight and resolute adaptation.

7) **Risk of social anxiety (including welfare, health, medical, and pharmaceutical services):** The burgeoning risk of social anxiety intertwines with a demand for comprehensive welfare, health, medical, and pharmaceutical services to alleviate the burdens of societal stressors.

8) **Environmental risks:** Within the maelstrom of environmental concerns, climate change, and global warming stand as paramount. Rising temperatures, glacial retreat, sea-level elevation, and extreme climatic phenomena beckon assiduous environmental stewardship.

9) **Political risks:** The geopolitical arena, fraught with nuanced intricacies and global dynamics, presents a canvas of political risks, necessitating sagacious diplomacy and international cooperation.

10) **Risk of consequential events not publicly disclosed:** The clandestine realm of undisclosed consequential events poses an enigma within this array of risks, urging transparency and preparedness.

11) **The other risks:** This enigmatic category embraces a mosaic of unknown risks, unveiling an indomitable imperative for rigorous scenario planning and adaptability.

Additionally, within the crucible of climate change and global warming, the foremost environmental peril of our time, a complex web of consequences is unfurling:

1) **Climate change and global warming:** Climate change is the most significant environmental risk facing the world, and it is caused by global warming. Rising temperatures, melting glaciers, sea-level rise, and extreme weather conditions are some of the consequences of climate change.

2) **Water scarcity:** As a result of climate change and other factors, water scarcity is becoming a significant issue worldwide. Droughts, water pollution, and overconsumption are some of the reasons for the water crisis.

3) **Food insecurity:** Climate change, water scarcity, and other factors are also contributing to food insecurity. As the world population grows, the demand for food is increasing, and this crisis is expected to worsen in the coming years.

4) **Energy crisis:** The world is heavily dependent on fossil fuels, which are a major contributor to climate change. The depletion of fossil fuels and the need for clean energy sources are creating an energy crisis.

5) **Biodiversity loss:** Climate change, deforestation, pollution, and other factors are contributing to the loss of biodiversity worldwide. The loss of biodiversity has significant consequences for the ecosystem and human survival.

6) **Health risks:** Climate change and other environmental factors are also creating health risks for humans. The spread of vector-borne diseases, air pollution, and extreme weather conditions are some of the health risks associated with environmental degradation.

In this epoch, marked by multifarious crises that reverberate across the fabric of our existence, it is imperative to recognize their intricate interplay, preparing with sagacity and cohesion. Within the chiaroscuro of unknowns and known risks, the future beckons for the vigilant, the adaptive, and the innovative—those who will brave the tempestuous tides of tomorrow with tenacity and foresight.

These crises are interconnected and addressing them requires a comprehensive and integrated approach. Failure to address these crises adequately could result in severe consequences for the world and future generations.

The “5th wave theory” emphasizes the need for a comprehensive and integrated approach to address the various crises facing the world today. One of the key priorities for higher education is to reinforce the “Knowledge Triangle”, which includes innovation, entrepreneurship, and university-business cooperation. By supporting these areas, higher education can play a critical role in achieving sustainable water management towards a Blue-Green clean technologically innovative economy.

The expected impact of the 5th wave theory on water management is significant. Sustainable water management is critical for achieving several SDGs related to water, including access to safe and clean drinking water, sanitation, and ecosystem preservation. The integration of various theories, models, and concepts is necessary to achieve sustainable water management. This requires a concerted effort from various stakeholders to work together towards the common goal of achieving these SDGs.

Furthermore, education and training are essential to equip the future workforce with the necessary skills to adapt to the changing demands of the economy and mitigate the impacts of climate change on water resources. By adopting a multidisciplinary approach and implementing sustainable practices, it is possible to create a prosperous and sustainable future for all while safeguarding our water resources for future generations.

“The 5th wave theory”—EXPECTED IMPACT through the support of innovation, entrepreneurship and university-business cooperation. One of the key priorities for higher education is the reinforcement of the

"Knowledge Triangle", through the support of innovation, entrepreneurship, and university-business cooperation.

Figure 6 illustrates the knowledge triangle, representing the interplay between:

1) Innovation,
2) Research, and
3) Education.

Figure 6 depicts the knowledge triangle, a symbiotic relationship between Innovation, Research, and Education. It is the key to unlocking the transformative potential of the "5th wave theory" as a solution to address the pressing issues of Risks and Forecasts of Global Temperature Increase and Climate Challenges.

Innovation is the driving force behind the development of cutting-edge solutions to mitigate the adverse effects of global temperature increase and climate challenges. It sparks creativity and entrepreneurial spirit, fostering the creation of novel technologies and sustainable practices.

Research forms the solid foundation upon which Innovation stands. It provides the knowledge, insights, and evidence necessary to drive informed decision-making and innovation. Through rigorous research, we gain a deep understanding of the complex issues surrounding global temperature rise and climate challenges.

Education acts as the bridge connecting Innovation and Research. It prepares the next generation of leaders and thinkers with the knowledge and skills to navigate and solve the problems posed by climate change. Education ensures that the discoveries and innovations derived from Research can be effectively communicated and put into practice.

The expected impact of the "5th wave theory" is profound. By reinforcing the knowledge triangle, higher education institutions can support the transition to a Blue-Green, technologically innovative economy while mitigating the consequences of global temperature increase. It fosters the development of policies and practices that address climate challenges, safeguard the environment, and ensure equitable access to resources.

Figure 6 highlights how the knowledge triangle, as guided by the 5th wave theory, serves as a comprehensive solution to tackle the complex issues of global temperature increase and climate challenges. This approach empowers us to make informed decisions, drive innovation, and educate future generations, ultimately leading to a more sustainable and resilient world.

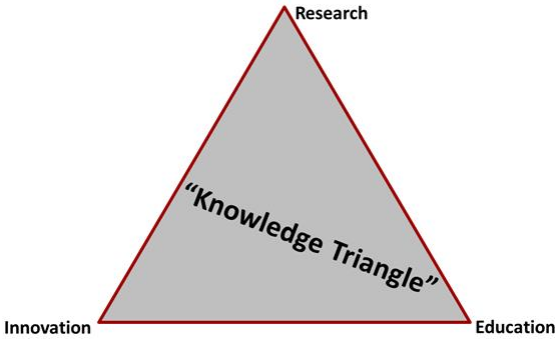

Figure 6. Knowledge triangle (Innovation, Research and Education) and expected impact of the 5th wave theory[10].

Addressing the risks and forecasts of global temperature increase and climate challenges demands an innovative approach. The 5th wave theory offers an anticipated impact, driven by its emphasis on:

1) Innovation,
2) Entrepreneurship, and

3) University-business cooperation.

All essential components of the "knowledge triangle". This approach can pave the way for practical solutions and insights, connecting the complexities of climate challenges with sustainable development and knowledge advancement.

5. Anticipating and mitigating the perils of escalating global temperature: Insights from 5th wave theory

The 5th wave theory provides a unique and comprehensive approach that can contribute to the anticipation and mitigation of the perils associated with escalating global temperatures and global warming. Here's how this theory can be a solution:

1) **Holistic understanding:** The 5th wave theory is rooted in a comprehensive understanding of complex challenges. When applied to the issue of global warming, it encourages a holistic perspective. Instead of addressing isolated aspects of climate change, it considers the interconnectedness of environmental, economic, social, and technological factors.

2) **Forecasting capabilities:** The theory's emphasis on forecasting equips us with the ability to anticipate the consequences of global warming. It aids in the identification of potential risks, allowing for proactive measures to be taken. By understanding how different elements of global warming interplay, we can make more informed predictions.

3) **Preventive measures:** The 5th wave theory extends to prevention. By analyzing the different waves of challenges, we can identify the underlying causes of global warming and take preventative measures. For instance, this might include policies to reduce greenhouse gas emissions, promote sustainable energy sources, and incentivize conservation efforts.

4) **Multidisciplinary approach:** The theory's multidisciplinary nature encourages collaboration between experts from various fields. This cross-pollination of ideas can lead to innovative solutions for addressing global warming. Experts from science, economics, technology, and social sciences can work together to devise effective strategies.

5) **Adaptive resilience:** The theory encourages preparedness for crises. In the context of global warming, this means developing adaptive resilience to cope with the inevitable impacts. By being prepared for extreme weather events, rising sea levels, and other consequences of global warming, societies can minimize damage and recover more efficiently.

6) **Sustainability emphasis:** The 5th wave theory places a strong emphasis on sustainability. It advocates for strategies that not only mitigate the impacts of global warming but also promote long-term environmental and societal sustainability. This includes measures like transitioning to renewable energy sources, reforestation, and sustainable agriculture.

7) **Technological advancements:** The 5th wave/tomorrow age theory recognizes the role of technology in both causing and mitigating global warming. By addressing the technological wave, it encourages the responsible development and deployment of advanced technologies to combat climate change.

8) **Social awareness and engagement:** The 5th wave/tomorrow age theory acknowledges the importance of addressing social anxiety and fostering a collective consciousness about global warming. By raising awareness and engaging the public, it encourages individuals to take more sustainable actions, influencing governments and industries to follow suit.

9) **Biodiversity conservation:** The 5th wave/tomorrow age theory highlights the vital importance of biodiversity. As global warming threatens ecosystems and species, it advocates for measures to protect and restore biodiversity, which can have cascading positive effects on climate regulation.

The 5th wave/tomorrow age theory, with its comprehensive, multifaceted, and proactive approach, can offer valuable insights and solutions for addressing global warming and the associated increase in global temperatures. By integrating these principles into policy and practice, societies can better prepare for and mitigate the perils of climate change, fostering a more sustainable and resilient future.

Anticipating the global temperature increase

The 5th wave theory's prognostication of a global warming increase crisis and the emergence of tomorrow's super-intelligent societies

The 5th wave theory, heralding from the dawn of this new age, has adroitly foreseen an impending global warming crisis that casts its long shadow upon the first edge of tomorrow, spanning the decade from 2020 to 2030. This foreboding prophecy has impelled the inception of communities, societies, cities, and business enterprises founded upon the bedrock of advanced technologies, the Internet of Things (IoT), and the formulation of judicious business strategies anchored in the tenets of sustainability. This collective endeavor has birthed novel paradigms—namely, "Tomorrow's Society and Business" and the exalted "Super-Intelligent Society"—that operate within the precincts of a super-intelligent business milieu.

Another theoretical cornerstone that buttresses this visionary framework is the "i-sustainability plus theory", an amalgamation of the triumvirate of open innovation, sustainability, and cutting-edge smart technologies typified by the 4.0 ethos. This embraces digitalization and the omnipresence of the super-intelligent society, aptly christened "Society 6.0". This composite configuration, marked by the confluence of sustainable weather and temperature, an astute societal framework, and a cityscape designed for the tomorrows yet uncharted, is articulated under the auspices of "URBAN 6.0". This revolutionary concept, bearing the imprimatur of Prof. Dr. Doost Mohammadian, embodies a novel blueprint for urban existence in the business and societal realms of the morrow.

The theoretical underpinnings of this visionary pursuit are multifarious, yet the lodestar remains the 5th wave theory, which culminates in a set of priorities unveiled through the discerning computation of three matrices, as evinced in **Figure 7**:

1) **SMEs with environmental responsibility:** With a pronounced focus on nurturing blue-green sustainable solutions, Small and Medium-sized Enterprises (SMEs) stand as vanguards of environmental stewardship.

2) **SMEs with social cohesion:** In a world ever more interconnected, the confluence of SMEs with a dedication to bolstering social cohesion assumes a central role.

3) **SMEs with economic efficiency:** Striking a harmonious balance between environmental responsibility and social cohesion, SMEs are vital instruments of economic efficiency.

The 5th wave theory, in its vanguard stance, pivots on preparedness for today's challenges, most notably the pursuit of sustainable temperature and weather, and the resilience to confront the tempestuous crises that tomorrow holds in its thrall. Within the ambit of this sweeping framework, the aspirant endeavours to enact strategies for preparedness, sculpt a tableau for the application of these theories, and scrutinize the resulting outcomes, premised on a bedrock of theoretical postulations (cf. the tenets of the 5th wave theory).

The intrinsic design of the 5th wave theory is trifold, emboldened by the overarching mandates to forecast, forestall, and confront the repercussions that the post-sustainability era shall bestow upon us. This unfolds through a systematic approach that encompasses:

1) Open innovation,

2) Methodical implementation,

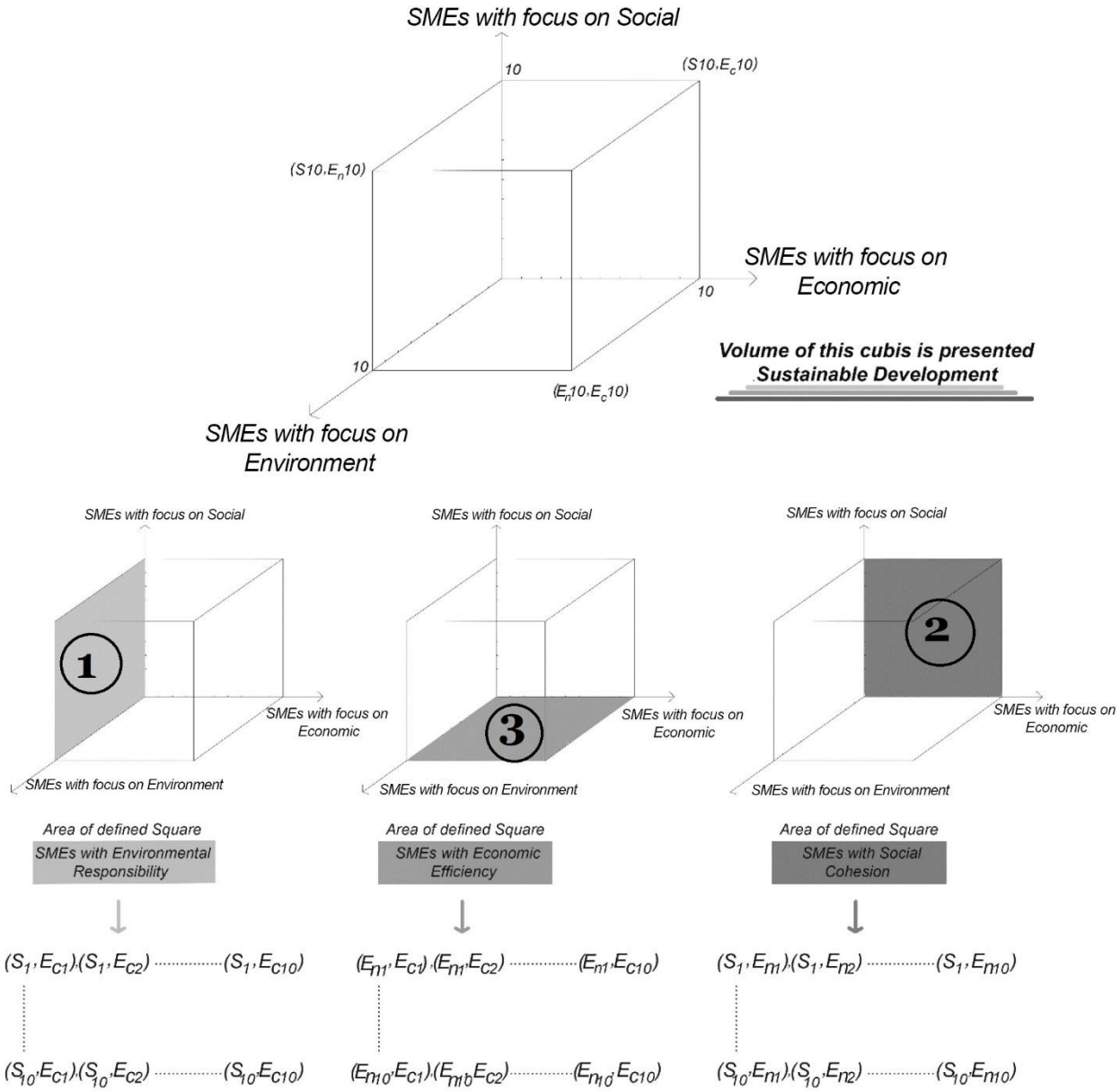

Figure 7. 3D SocioEcoEnvironment SME model with environmental responsibility priority[8].

3) Diligent development, and

4) The practical application

of these advanced technologies. This holistic endeavour is tailored to yield a fount of blue-green sustainable temperature and weather, all ensconced within the edifice of digital innovation and resilience strategies tinged with a Corporate Social Responsibility (CSR) approach. This orchestration extends its auspices to the realms of "Urban 6.0", "SME 5.0 in Industry 5.0", and the illustrious "Society 6.0", typifying the super-intelligent society of the future.

In the endeavour to rehabilitate our world, laden with the mantle of environmental responsibility, social cohesion, and economic efficacy, the symphony of cohesion reverberates as the crux. This symphonic harmony is vital to ensure a harmonious resurgence from the throes of the coronavirus pandemic, with a resolute commitment to leave no soul behind. The graphic tableau is vividly painted within the recesses of **Figure 7**.

Amidst this ambitious vision, the REACT-EU initiative assumes an exalted role, seeking to expand its mantle to the sectors and regions most acutely affected. It propounds to:

1) **Strengthen the healthcare system:** Bolstering the healthcare infrastructure stands as the paramount mandate to fortify society against future health crises.

2) **Support affected citizens:** Job creation forms a salient strategy to offer solace and support to citizens who have borne the brunt of calamity.

3) **Enhance basic services:** The enhancement of essential services, forming the bedrock of societal wellbeing, remains an imperious endeavour.

4) **Promote economic resilience and sustainability:** The initiative champions the transformation of world economies into bastions of resilience and sustainability, thereby ushering in an era of progress and prosperity.

In the annals of tomorrow's narratives, as we stand at the cusp of an era shaped by formidable environmental challenges, the 5th wave theory, "Tomorrow's Society and Business", and the evanescent yet promising "Super-Intelligent Society" offer a beacon of hope and strategy. In unity, we strive to confront the spectre of a global temperature and weather crisis while ensuring the prosperity and well-being of all, transcending the trials of our time into the triumphs of the morrow.

6. Solution via the Novak triangle

Also, or especially, in the case of global overheating, the ultimate question is how to get people, i.e., the inhabitants of this world, to behave adequately in terms of climate protection. Much has been tried in the past, but little has worked. One cannot come to any other conclusion, given the very manageable progress since the eye-opening book *The Limits to Growth*, produced by MIT in Boston and published by the Club of Rome[11].

Most people, via typical human behavior, tend to engage in two behaviors, one of which is as fatal as the other. On the one hand, one generally does not want to change one's behavior (humans are typical "creatures of habit", motto: "Not in my backyard"), on the other hand, one does not want to admit to having done it wrong in the past (motto: "What was right in the past cannot be wrong today"). The states have only three possibilities to change the behavior of the people: 1) the Russian way: to force the own population with laws, threats and hardest punishments for the desired behavior; 2) the German way: to try to convince the people first and to bring them later over mainstream in the media and "talking to death" to a certain behavior; or just the American way: by motivating the people themselves to do something, so that they can either lower their costs (save money), or make profits (earn money). It seems obvious that the American way makes the most sense, because it is the fastest and most promising. Ultimately, it offers a win-win situation for all parties involved, including flora, fauna and climate[12].

Figure 8 presents the Novak triangle, which provides a solution for addressing the pressing challenges of global overheating and climate change, particularly in the context of *Risks and Forecasts of Global Temperature Increase and Climate Challenges: Insights from the 5th Wave Theory and Novak Triangle*.

The central dilemma is how to motivate individuals, the world's inhabitants, to adopt behavior conducive to climate protection. Previous efforts have shown limited success, despite the release of the influential book *The Limits to Growth* in 1972 by MIT and the Club of Rome.

Human behavior typically falls into two categories, both of which can be detrimental. First, individuals often resist changing their habits (commonly known as the "Not in my backyard" mindset). Second, there is a reluctance to acknowledge past mistakes ("What was right in the past cannot be wrong today").

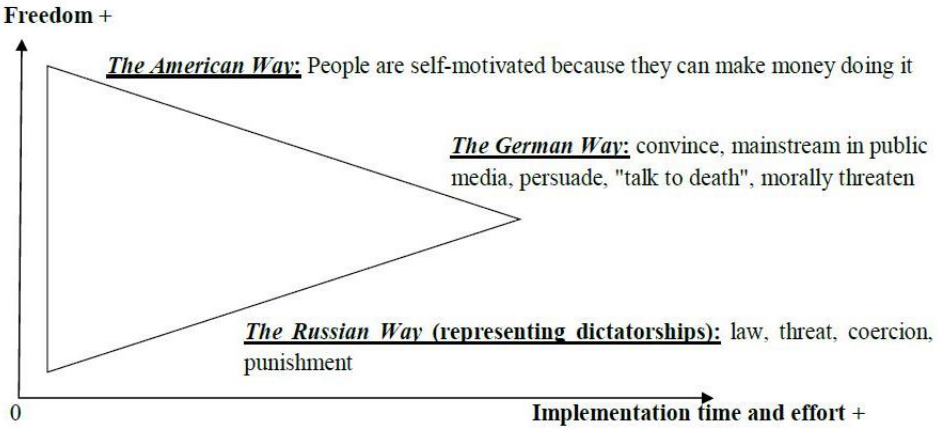

Figure 8. Novak triangle[12].

Conflict of interest

The authors declare no conflict of interest.

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