From Silos to Synergies: G20 Governance of the SDGs, Climate Change & Digitalization[1]

J. Kirton, B. Warren

John Kirton - Professor, Co-director of BRICS Research Group, Director of G8 Research Group, Co-director of G20 Research Group, University of Toronto; 100 St. George, M5S 1A1, Toronto, Ontario, Canada; E-mail: john. kirton@utoronto.ca
Brittaney Warren - director of policy analysis and lead researcher on climate change for the G20 Research Group, the G7 Research Group and the BRICS Research Group at Trinity College in the University of Toronto. E-amil: b.warren@mail.utoronto.ca

Abstract

How well and why have Group of 20 (G20) summits advanced Agenda 2030's sustainable development goals (SDGs) in a synergistic way, with climate change and digitization at the core? An answer to this urgent, indeed existential, question comes from a systematic analysis of G20 summit governance of the SDGs, climate change and digitization to assess the ambition and appropriateness of advances within each pillar and the synergistic links among them. This analysis examines G20 governance of the SDGs, sustainable development, climate change and digitization across the major dimensions of performance and evaluates how performance has changed and become synergistic with the advent of the SDGs in 2015 and the shock of the COVID-19 crisis in 2020. The latter has shown the need to prevent global ecological crises and spurred the digitization of the economy, society and health. Yet, G20 summit governance has largely remained in separate silos, doing little to use the digital revolution to address climate change or reach the SDGs. This highlights the need for G20 leaders to forge links at their future summits by mainstreaming the SDGs and mobilizing the digital revolution and climate action for future health and well-being.

Key words: G20, SDGs, climate change, digitization, synergies
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Introduction

The Challenge

In September 2015, world leaders gathered at the United Nations to launch the historic 2030 Agenda and its 17 Sustainable Development Goals (SDGs). When they returned in September 2019 to review their progress, just as the second trimester to achieve them approached, they found advances on some. These were led by SDG 1 on "No Poverty" and SDG 9 on "Industry, Innovation and Infrastructure", and by countries in East and South Asia and by low- and middle-income ones (Steiner 2020) (see Appendix A). But they also found slow progress or even reversals on SDG 2 on "Zero Hunger" and SDG 15 on "Life on Land".

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To spur more progress, when Saudi Arabia on December 1, 2019 announced its priorities for its year as G20 host in 2020, it included the SDGs. Moreover, it gave the environment and climate change a central place. It also included the critical instrument of digitization, a subject that had been gaining strength in G20 summitry in recent years (Kirton and Warren 2018).

Then came COVID-19 as 2020 began. It destroyed 30 years of development in 30 weeks. COVID-19 lockdowns' brought small, short-term benefits for the environmental SDGs 12 to 15. But these were overwhelmed by its harm to the SDG's on poverty, hunger, health, education, gender equality, decent work, economic growth and reduced inequalities. In all, COVID-19 put the prospects of achieving the SDGs by their 2030 due date much further behind. By the time the Riyadh G20 Summit took place on November 20-21, 2020, COVID-19 had crushed "SDG-17," rather than the reverse. COVID-19 also made health, and its immediate economic and social impacts, the Riyadh G20 leaders' overwhelming priority, as it had been at the G20's first ever emergency summit they had mounted virtually on March 26, 2020. Here COVID-19 completely crowded out action on climate change, despite the integral links between the two. Moreover, only a small 30% of G20 countries' economic stimulus packages, endorsed and enhanced at the summit, went towards a green, clean recovery (Climate Transparency 2020).

Can the most powerful leaders of the world's most systemically significant countries at their G20 summits put SDG progress back on track, while coping with the continuing crises of COVID-19, climate change and economic contraction? To do so they must mobilize the critical instrument of digitization. Digitization was largely absent from the SDGs in 2015. But COVID-19 suddenly made it central to life, work, policy, governance and summitry around the world. G20 leaders must also use the full power of digitization to help control the current existential crisis of climate change which, in its many dimensions, the 2015 SDGs had made central to their integrated whole. This requires taking into account digitization's own expanding emissions footprint and the inequitable digital divide.

Debate

How well and why have G20 summits advanced the SDGs in a synergistic way with climate change and digitization and how can they do better in the years ahead? These key questions have inspired a debate among four major schools of thought.

The first school saw continuing failure. Homi Kharas et al. (2018, 31) highlighted "substantial shortcoming in G20 member countries' approach to agenda setting, implementation, and monitoring" of the 2030 Agenda at the national and international level, and the resulting need from the world's largest economies for a collective G20 report and action plan on the 2030 Agenda's implementation, including on the environmental SDGs.

Andrea Ordonez et al. (2018, 39) emphasized G20 members' compliance with their commitments to the very broad SDGs. They argued that to implement the high level

commitments made at the G20's 2016 and 2017 summits, the G20 "must go beyond the sectorial choices of particular SDG policies and focus on...keeping coherence between the social, economic and environmental dimensions of development." They should do this by having the G20 Development Working Group coordinate with other work streams.

Elisabeth Bollrich and Jochgen Steinhilder (2020) argued that the digital transformation and environmental change force a reassessment of the economy-society relationship and that this requires synergies of a broader scope than global governance institutions currently provide. They endorsed the recommendation of the Think 20 (T20) Task Force on the 2030 Agenda that financing the SDGs and financial regulation go together. But they advocated a reliance on public rather than the private finance that G20 summits have emphasized since the start. Nora Lustig (2018) emphasized that this shift should protect the poor.

The second school saw decline, from an initial surge to a subsequent drop. Stefan Bauer, A. Berber and G. Iacobuta (2020) argued that the G20, representing 80% of the global economy and its greenhouse gas emissions, strongly advanced the SDGs and climate change control at their summits in 2015 and 2016, in the wake of the UN summit agreements on these subjects in September and December respectively. But G20 performance then declined, due to the arrival of skeptical new leaders in the United States and Brazil, rising populist and nationalist parties in G20 members, and the low commitment of the G20 host in 2018. To revive performance, they recommended focusing on synergistic actions that benefit both the SDGs and climate change, partnering with non-state and substate actors, overcoming the siloed work of G20 working groups, and having T20 task forces work on synergistic rather than specialized recommendations. John Kirton and Brittaney Warren (2021) agreed.

Thomas Fues (2017) focusing on Germany's 2017 Hamburg Summit, argued that "Building on China's preceding G20 presidency, Berlin will also emphasize the key relevance of the Sustainable Development Goals to a universal policy framework and will call for special efforts on Africa. However, it remains to be seen if Germany can achieve anything of relevance…", due to the arrival of Donald Trump as U.S. president and Germany's surging right wing populist party and restricted fiscal space, despite a determined Angela Merkel as host.

The third school saw a rise in G20 summits' synergistic SDG performance and potential. John Kirton [2020a, 18] argued that G20 summits had been slow to meet the fully globalized challenges of health, climate change and digitization. But, spurred by COVID-19, the G20 did better in preparing the 2020 Riyadh Summit and could do more by, inter alia, "holding a second annual summit at the UN each September focused on the sustainable development goals."

Achim Steiner (2020), while acknowledging the great setback caused by COVID-19 in 2020, argued that the G20 could and would be the "catalytic actor" to put the SDGs synergistically back on track, due to its enormous predominant capability of 80% of global gross domestic product (GDP), the supportive UN summitry in September 2020, and the

compelling need to confront the unprecedented shocking setbacks brought by the COVID-19 crisis since 2020 began.

The fourth school saw sustained success on the core 17 SDGs as a whole. Sonja Dobson (2020) argued that G20 summits had performed highly in producing development communiqué conclusions, leaders' commitments and solid compliance. Leaders could improve compliance by making stronger commitments, by "specifically invoking the 2030 Agenda and its SDGs" in them and by linking them to climate change.

Puzzles

These schools leave several puzzles for those seeking to understand and improve the synergies of global governance in the SDGs and G20. First, they downplay the digitization that was largely absent from the SDGs in 2015 but that came to dominate life in 2020 and beyond. Second, they often pass over the foundational fact that the SDGs were deliberately designed as an integrated whole, with the fate of each depending on that of the others and on the direct contribution of all developed, emerging and developing countries, with an emphasis on the latter. Third, they fail to emphasize the unique value of the G20 summit due to its leaders' ability to govern with their highest level authority all subjects together at the same time, with actions that can maximize the co-benefits for all. Fourth, few focus on the critical governance dimension of the G20 members' compliance with their leaders' summit commitments, the causes and corrections of this compliance and, based on this relationship, how leaders can use synergies among the most closely related subjects to secure more of the compliance and commitments they seek and need. In short, synergies, not silos are the solution to the scholarly and policy puzzles of how the G20 has and can secure the SDGs by governing climate change control and digitization as an integrated whole.

This study seeks to help solve these puzzles by offering the first systematic analysis of how the G20 summits have and can govern the SDGs, climate change and digitization synergistically, to the benefit of all.

Thesis

This study argues that the G20's governance of its SDGs, climate and digitization silos have had few synergies, but that G20 leaders can forge many more to improve compliance with their commitments on them, to the benefit of all. G20 leaders' SDG communiqué conclusions, commitments and members' compliance started only at Antalya in November 2015, peaked at high levels at Hamburg in 2017 and plunged to nothing at their Saudi Arabian hosted emergency summit on March 26, 2020, and almost nothing at the regular summit in Riyadh on November 20-21, 2020. Their performance on climate change started much sooner, at Washington in 2008, rose rather steadily to peak at a significant level at Hamburg, but then ratcheted down to disappear on March 26 and diminish on November 21-22, 2020. Their performance on digitization started in a tiny intermittent way from 2008

to 2014, surged to significant levels at Hangzhou in 2016 and Hamburg in 2017, then dropped to virtually disappear on March 26 and November 21-22, 2020 .

Throughout their very similar trajectories, their synergies were always few and fragile, with no links made among all three subjects at the same time. This was true even since 2015, when the SDGs and G20 governance of them arrived to join the G20's earlier action on climate change. This lack of trilateral synergies continued since 2016, when surging G20 action on digitization offered many more opportunities for leaders to forge links among the three. But even then G20 commitments never made a synergistic link among all three. And even the silos surged together only in 2017 and 2019, to plunge to low levels in 2020 when they were crowded out by climate change.

However as such synergies contained within leaders' commitments do improve members' compliance with them, G20 leaders can and should move from silos to synergies at future summits to the benefit of all. They should also, as a foundation, wisely use the other proven instruments they control to improve compliance with their commitments on all three pillars. The priorities of Italy as G20 host in 2020 present a promising agenda for this to start. Further propellers come from a new U.S. president committed to climate change action and the pull of the long delayed UN climate summit on November 1-22, immediately after the Rome G20 Summit ends.

Organization

To develop this argument, this study first outlines the close connections among sustainable development, climate change and digitization in the material and global governance world and the unique responsibility and capacity of G20 summits to reap the synergistic co-benefits among them. Second, it examines G20 summit conclusions and commitments on the SDGs, members' compliance with them, the links to climate and digitization these commitments contain, and how such synergies affect compliance. Third, it does so for climate change, and its links to the SDGs and digitization. Fourth, it does so for digitization and its links to the SDGs and climate change. Fifth, it examines how the most recent G20 summits, in 2020, governed these three pillars and their synergies. Sixth, it concludes by considering how such synergies have and could improve compliance, in the context of the other causes and the leaders' accountability measures at work.

Sustainable Development, Climate Change and Digitization Synergies

Sustainable development, climate change and digitization are intimately connected in the material world, but have not been in global governance edifice centered in the UN since 1945.

In the material world, climate change, its chronic effects such as rising heat and seas, and its extreme weather events such as rains, floods, tsunamis, hurricanes, wildfires and

drought harm and kill those in developing countries more than those in the developed world that largely caused the problem. Moreover, development cannot be sustainable without a swift, strong reversal of the accelerating rise in greenhouse gas concentrations and temperatures and the biodiversity loss intensified by this climate change. Digitization is integrally connected to both sustainable development and climate change. Even as digitization becomes central to development in its economic, social and now health dimensions, almost half the world's people, due to poverty, remain unconnected to the internet, especially in a reliable, affordable, safe and secure way. Digitization is increasingly connected to climate change, due to its exploding demands for electricity still generated largely by fossil fuels, and its help in monitoring the earth's complex climate system and the forests that serve as carbon sinks and helping plant the trees that are lost to wildfires, heat and drought.

Yet in the political world of global governance, sustainable development, climate change and digitization remain largely unconnected. In September 2015, a UN summit did launch its Agenda 2030 with 17 Sustainable Development Goals, with SDG dedicated to climate change control and several surrounding ones on land, ocean, water and energy in direct support. But coming well before the digital revolution, now spurred by the COVID-19 lockdowns since 2020, it had no SDG on digitalization itself. Moreover since 2015 UN summits, focused on single subjects, have not brought digitalization into the mix, nor spurred the needed new generation of global digital governance itself. Since 2016, only the annual G20 summits, with their comprehensive mandate, have increasingly governed sustainable development, climate change and digitization at the same time. It is thus important to examine in detail how they have done so, and how much they have forged the synergistic, co-beneficial links among all three.

To do so this study traces G20 summit performance on each of these three pillars using the proven methods examining global governance as a whole. The first uses as its material the outcomes documents that G20 leaders release at their summits, and a quantitative content analysis of them and interpretive textual analysis of their content. The second is a systematic analysis of the compliance of each G20 member with each of their priority development, climate and digitalization commitments, during the summit that makes them until the next summit comes. Compliance of each member on each commitment is scored a -1 or 0% for no compliance or action antithetical to the commitment, 0 or 50% for partial compliance, and +1.00 or 100% for full compliance (Kirton and Larionova 2018). Compliance consists of member government's implementing actions, as distinct from the outcomes or results they achieve in the real world. Yet without leaders' collective commitments and subsequent compliance, such rapid real world results will not come. Moreover, on repeated G20 commitments critical to the SDGs and climate change, such as that to phase out fossil fuels subsidies, there are many, highly credible estimated from the world's leading multilateral organizations, about the broad array of beneficial results such government actions would have (IISD 2019).

The third method is elite specialized interviews with G20 leaders, their personal representatives and other G20 officials, drawing from an inventory that has reached over 200 interviews thus far (Kirton 2013, Kirton and Kokotsis 2015). G20 governors and a

broader set of G20 stakeholders are also offered an opportunity to review the compliance assessments conducted every year.

G20 Governance of the SDGs

Conclusions, Commitments and Compliance

G20 summits did nothing to reinforce or even recognize the 2030 Agenda or its SDGs before their launch at the UN summit in September 2015 (see Appendix B, C, D). Two months later, at Antalya the G20 summit followed the UN by starting to give substantial and rising attention to the SDGs. The G20 peaked with 4,138 words (or 12% of its communiqué) at the Hamburg Summit on July 7-8, 2017. Attention then plunged at Buenos Aires in 2018 but revived to take 819 words (and 12% of the total) at the Osaka Summit on June 28-29, 2019. Then it vanished at the leaders' emergency virtual summit on March 26, 2020. Here COVID-19 completely crowded out the SDGs and climate change. It reduced digitization to three words in a general commitment to "leverage digital technologies" to "respond to potential infectious disease outbreaks." Throughout this cadence, there was limited attention to climate change and less to digitization, and even less to both, in the context of, or in combination with, the SDGs. The cadence of their co-existence and combination largely matched that of the G20 summit's attention to the SDGs as a whole, up to and from the Hamburg high.

Antalya 2015

At Antalya, Turkey on November 15-16, 2015, G20 leaders dedicated 452 words in four paragraphs to the SDGs. There was one link to climate change and none digitization. The closest came in a sentence that did not refer to the SDGs, but followed one that did. It endorsed food systems that "environmentally" supported quality and diverse diets.

These 452 words contained three commitments with an explicit reference to the SDGs within the commitment text and one more in the surrounding paragraph that did. These four SDG commitments contained only one referring to climate change and none to digitization.

The one SDG commitment assessed for compliance, that on remittances, averaged compliance of only 50%. This was lower than the 64% compliance with the three assessed commitments on development as a whole. G20 members were slow to adjust to the new SDG world.

Hangzhou 2016

At Hangzhou, China on September 4-5, 2016, G20 leaders gave 527 words in four paragraphs to the SDGs. One of these paragraphs referenced climate change and one to the digital economy.

G20 leaders produced six commitments explicitly referencing the SDGs and four more referring to "sustainable development" more broadly. Among these six SDG-specific commitments, one was linked to climate change, in the form of the Paris Agreement. It stated: "We are determined to foster an innovative, invigorated, interconnected and inclusive world economy to usher in a new era of global growth and sustainable development, taking into account the 2030 Agenda for Sustainable Development, the Addis Ababa Action Agenda and the Paris Agreement." One of the broader sustainable development commitments pledged: "we reiterate our commitment to sustainable development and strong and effective support and actions to address climate change." None of the six SDG-specific or broader sustainable development commitments referred to digitization.

The one SDG commitment assessed for compliance, that on implementation in a siloed form, averaged compliance of 93%.

Hamburg 2017

At Hamburg, Germany on July 7-8, 2017, the G20's SDGs performance soared, to dominate the summit in the number of commitments it made. Leaders devoted 4,138 words, or 12% of the total to the SDGs, an almost tenfold increase from the previous years. They made 203 commitments on the SDGs, or 38% of the 529 commitment they made overall, and far more than any other single subject took. The one assessed SDG commitment averaged compliance of 88%.

Within these SDG communiqué conclusions, the synergies with climate change and with digitization increased to seven explicit references to digitization. Within the SDG commitments, the synergies with climate change and digitization increased too. A full 40 directly referenced the SDGs or specific SDGs.

Of these 40, four (10%) included a reference to climate change, always to the UN Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. There was no recognition that the SDGs and climate change were or could be linked, apart from their coexistence as goals of parallel UN agreements. This suggested that in these four linked SDG-climate change commitments, the G20 was supporting UN agreements in general, rather than the substance of climate change control.

Another seven (18%) of the 40 commitments referenced the natural environment more broadly. They did so usually through references to SDG's 12, 14 and 15. It is striking that in this repeated reliance on the SDG's environmental sequence, G20 governors always skipped SDG 13 on climate change.

Four (or 10%) of the SDG commitments referred to digitization. They had an economic emphasis, dealing with the agriculture sector, digital connectivity, digital trade and the digital economy (with an emphasis on women and girls).

None of the 40 SDG commitments contained a reference to both climate change and digitization. Moreover, the four direct SDG commitments that referenced climate change

had no synergies with other subjects. Nor did the four SDG-digitization ones, beyond the subjects noted above.

The three SDG commitments assessed for compliance averaged 88%. None were linked to climate change or to digitization. But among the broader set of "sustainable development" commitments, one promised to "strengthen digital and financial literacy and capability." It secured compliance of 88%, higher than the 79% average of the three assessed development commitments as a whole. This showed that such synergistic commitments could secure high compliance and higher compliance than the siloed ones.

Buenos Aires 2018

At the Buenos Aires Summit on November 30-December 1, 2018, attention to the SDGs dramatically dropped to 240 words, in a single paragraph, taking only 3% of the leaders' communiqués.

This short SDG paragraph was fully dedicated to encouraging the implementation of the health-related SDGs, including on anti-microbial resistance and Universal Health Coverage (UHC). It made no link to climate change or digitization.

The G20 made one commitment on the SDGs and another on sustainable development more broadly. The latter linked to climate change, by stating: "we will continue to tackle climate change, while promoting sustainable development and economic growth."

Osaka 2019

At the Osaka Summit on June 28-29, 2019, attention to the SDGs bounced back a bit to 819 words in seven paragraphs. It joined Hamburg in taking a peak of 12% of the communiqués.

This G20 made no explicit link between the SDGs and climate change. However, it did link the SDGs to the environment and disaster risk resilience. In two of the seven paragraphs, G20 leaders referenced the environment. This included one general reference to "support developing countries in their efforts to advance progress towards the timely implementation of the SDGs in such areas as…environment" and a recognition that the circular economy and waste management "contributes to the SDGs." Lastly, in one paragraph on the SDGs the G20 recognized the importance of disaster risk reduction and financing. However, the explicit link to SDGs in this paragraph came in the preceding sentence where the G20 endorsed the Guiding Principles for the Development of Science, Technology and Innovation for SDGs Roadmap, which did not itself refer to climate change or natural disasters in its guiding principles (G20 Development Working Group n.d.). This shows that the G20 somewhat closed the siloes between the SDGs and environmental pollution.

Two SDG paragraphs centred on digitization. They addressed trustworthy digitization; the effective use of data for economic, development and societal well-being; artificial

intelligence (AI) and the Internet of Things (IoT); bridging the digital divide; digitization of micro, small- and medium-sized businesses; and smart cities (which are highly relevant for meeting climate goals). On AI the G20 stated: "The responsible development and use of Artificial Intelligence (AI) can be a driving force to help advance the SDGs and to realize a sustainable and inclusive society." Under the technologically advanced Japanese host, promoting its own plans to move towards "Society 5.0," the G20's SDG-digital deliberations expanded and became more specific.

Commitments on the SDGs rose to 16. One was linked to climate change, again to "sustainable development" rather than the "SDGs" themselves. It came under a section dedicated to tackling climate change, and saw the leaders commit "to foster inclusive finance for sustainable development, including public and private financing mobilization and alignment between them."

Compliance with two of the assessed commitments averaged a high 90%. One of these was a direct SDG commitment, stating the G20 supported developing countries to implement "the SDGs in such areas as…energy." It therefore had strong implications for climate change as the traditional energy sector is the leading source of greenhouse gas emissions globally. This commitment secured average compliance of 88%. The second sustainable development commitment was to invest in human capital for sustainable development, with 93%.

Causes and Corrections

There are several causes of this compliance with SDG commitments. Among them are inexpensive accountability measures that are under the G20 leaders' direct control and that can help or hinder, or correct, compliance. They include the number of words and commitments dedicated to the same subject at the same summit, holding pre-summit ministerial meetings, and referring to a core international organization within the commitments.

Among the larger group of assessed development commitments, there is a negative correlation between the number of development commitments and compliance with them (Hallink 2019, Dobson 2020). This suggests that more is not always better and that the G20 can have high compliance by focusing on a few key development subjects. Holding a pre-summit development ministers' meeting leads to better compliance, as well as a reference to the core institutions responsible for delivering the SDGs of the World Bank and the UN (Hallink 2019). Compliance is also 16% higher with development commitment with highly binding verbs (such as we "shall" or "will") (Dobson 2020).

Synergies as Cause of Compliance

Another cause of compliance are synergies made with other subjects directly in the commitment itself. The G20's compliance with all six assessed sustainable development commitments was a high 82%. This was higher than the 66% compliance secured from all

52 development commitments over time. Moreover, the three assessed development commitments that referred specifically to the SDGs achieved compliance of 77%, compared to only 67% for those that did not (Dobson 2020). Compliance with development commitments was 10% higher when they were linked to other subjects, "led by financial regulation, macroeconomic policy, trade, infrastructure and climate change" (Dobson 2020: 112). Compliance with development commitments was 10% higher when they referred to digitalization. This suggests that linking the G20's development commitments to the SDG's 17 global goals, and to climate change and digitalization may add impetus to the G20's motivation to comply with them.

G20 Governance of Climate Change

Conclusions, Commitments and Compliance

The G20, whose members account for about 80% of greenhouse gas emissions and a strong majority of the world's carbon sinks, has governed climate change since the G20 summit's start in 2008-09 (Warren 2020a, b; Kirton and Warren 2020). Since then, while the G20 has increasingly governed climate change, it has done so only to a small degree; it has not kept up with the science and urgency of the climate crisis the science shows and that many increasingly feel.

Before 2015 there were no G20 synergies between climate change and the digital economy or the SDGs, as the Agenda 2030 on Sustainable Development and its SDGs did not appear until 2015. Between 2009 and 2015, sustainable development more broadly was referred to in the leaders' climate deliberations primarily in the context of green growth. The 2017 Hamburg Summit made the first climate-SDG link.

At its first summit in Washington in November 2008, climate change was crowded out by the great financial crisis. G2 leaders gave only 64 words, or 2% of its communiqués, to climate change and made no climate commitments (Kirton and Kokotsis 2015).

At their second summit in London in April 2009 leaders began making politically binding climate commitments. Their 64 words on climate change contained three commitments, including one on a green recovery. However, this commitment secured only 45% compliance.

At the Pittsburgh Summit in September 2009 climate change rose to take to take 911 words, or 10% of the communiqués, and three commitments. The one assessed had 93% compliance, the highest until 2019. It was with a broad commitment to support the 2009 UNFCCC climate negotiations on mitigation, adaptation, technology and financing. To be sure, the breadth of action that could count towards compliance with this commitment might not capture the influence of the BRIC group of emerging economies of Brazil, Russia, India and China that many criticized for undermining the UN's Copenhagen climate negotiations later that year. At the same time, the accuracy of this high compliance,

partly coming in the half year after the Copenhagen Agreement, is verified by, and may reflect, the inclusion of these emerging economies in an international climate agreement, even if not a legally binding one, for the first time (Lefton, Light and Weiss 2009).

The Toronto Summit in June 2010 gave climate change 838 words for 7% of the communiqués and produced three commitments, with 71% compliance. The one on a green recovery had 70%. The one reaffirming support for climate negotiations at Copenhagen dropped to 47%. The third, to include the principle of common but differentiated responsibilities, had 95%.

At Seoul in November 2010, climate change surged to 2,018 words and 13% of the communiqués, amidst a stronger focus on sustainable development in general. But Seoul's eight climate change commitments averaged compliance of only 53%. The three the Copenhagen Accord averaged 67%. The one linked to green and environmentally sustainable growth, while ensuring employment and energy access for the poor had only 25%.

The Cannes Summit in November 2011 gave climate change 1,167 words for 8% of its communiqués and eight commitments. Their average compliance rose to 69%. Two referenced "sustainable development." They made clear, explicit links to climate change and secured high compliance. The one to "promote sustainable development and green growth and to continue our efforts to face the challenge of climate change" secured 98% compliance. The one to "promote low-carbon development strategies in order to optimize the potential for green growth and ensure sustainable development" secured 83%. These were broad commitments and a wide range of actions may have been available to the G20 members to secure such high compliance. This conjecture is supported by the compliance evidence on the third, more precise, assessed commitment to operationalize the Green Climate Fund. It secured just 28%.

At Los Cabos in June 2012, climate similarly took 1,160 words for 9% of the communiqués and eight commitments with 80% compliance. A reiterated commitment "to promote sustainable development and green growth and to continue efforts to face the challenge of climate change" secured a perfect 100%. The very general one "to fight climate change" had 85%. The specific one on the launch of the Green Growth Knowledge Platform had 53%.

The St. Petersburg Summit in September 2013 produced 1,697 words for 6% of its communiqués on climate change. Its commitments rose to 11 but compliance plunged to 42%, with the three assessed all under 50%. The one to implement the outcomes of the Durban climate meetings had only 38%. The one on the Green Climate Fund had 40%. And the one to support complementary initiatives to the Montreal Protocol had 48%.

At the Brisbane Summit in November 2014, climate change was crowded out by the diversionary health shock of the Ebola crisis. Climate change dropped to 323 words for 4% of the communiqués. The number of commitments dropped to seven. Yet compliance with them bounced back to 76%. Still the weakest were the two climate financing commitments

to the Green Climate Fund, scoring 55% and 63%. The one that economically linked the UNFCCC with supporting business certainty and investment had 90%. One linking the UNFCCC to economic growth and one linking the UNFCCC to supporting sustainable development each had 85%.

Antalya in November 2015 saw a comeback in climate deliberations, with 1,129 words taking 8% of the communiqués. Yet they contained only three commitments. All focused on the UNFCCC's COP21 a few weeks later that produced the Paris Agreement. One commitment reiterated the 2014 link of the UNFCCC to sustainable development but not the SDGs. Compliance with it was again 85%.

The Hangzhou Summit in September produced 1,754 words on climate change, for 110% of communiqués. But they contained only two commitments. The one referencing sustainable development had 73%, while the procedural one to align the G20's domestic procedures to join the Paris Agreement averaged 93%. Hangzhou's climate commitments made only one reference to sustainable development broadly. Nor did they link them to the digital economy, despite innovation being a central theme of the summit.

The Hamburg Summit in July 2017 had the highest number of words on climate change in G20 history, of 5,255. It had the second highest proportion of words at 15%, surpassed only by the Osaka Summit in 2019. Hamburg also had the highest number of climate commitments at 22. It made the first direct link to the SDGs in them, but none to digitalization. Compliance averaged 71%. Once again, the lowest compliance came from the climate finance commitment with 43%. This was followed by a specific one to support several adaptation networks and alliances at 55%. The one on climate mitigation, with a focus on innovation scored 80%. The broad one on promoting adaptation generally scored 83%. The highest compliance came on market barriers to private green investment, with 95%.

Buenos Aires in November 2018 saw a steep drop to 532 words for 6% of the communiqué and three commitments. One referred to sustainable development, but not the SDGs. None referenced digitization. The two assessed climate commitments averaged 78%, an improvement from the previous year. The one to implement the Paris Agreement had 87%, but it excluded the U.S. which had announced its withdrawal from the Agreement. The other adaptation commitment, to support climate vulnerable countries such as small island states, had only 70%.

The Osaka Summit in July 2019 surged to produce 2,034 words on climate change. This was the highest portion in the G20's history, at 24% of the leaders' communiqués. It had 13 commitments, second only to Hamburg's 22. However, three were not fully collective commitments. The one on the Paris Agreement's "irreversibility" excluded the U.S.. Two others included only the U.S, including a reiterated U.S. commitment to withdraw from the Paris Agreement. By October 10, 2020, compliance with three of these 13 commitments averaged 76%. One referenced sustainable development, although not the SDGs. It stated: "we strive to foster inclusive finance for sustainable development, including public and private financing mobilization and alignment between them." Unlike past climate

financing commitments, which had focused on multilateral UN-led climate finance mechanisms and targets such as the Green Climate Fund, this private sector focused commitment had high compliance of 93%. The second assessed commitment, on "innovation…for low emissions and resilient development" secured 85%. The third commitment, promising to communicate, update or improve nationally determined contributions to the Paris Agreement, had only 50%.

None of the 13 climate commitments explicitly referenced digitization. But implicated in the digital era was one exploring clean technologies and approaches for smart cities. It secured compliance of 70%. The OECD defines smart cities as "initiatives or approaches that effectively leverage digitalisation to boost citizen well-being and deliver more efficient, sustainable and inclusive urban services and environments as part of a collaborative, multi-stakeholder process" (OECD 2020).

Causes and Corrections

Given the G20's low compliance with its climate change commitments, particularly in the context of the growing urgency to reverse global emissions growth, it is vital that the G20 improve its compliance. As with its SDG commitments, similar accountability measures stand out to help achieve this.

This includes producing fewer words and commitments on climate change (Warren 2020). This does not mean the G20 should pay less attention to climate change. Rather, it suggests the G20 should focus on a few big ticket items, such as shifting subsidies from fossil fuels to renewables and the SDGs. Complying with the one commitment to phase out inefficient fossil fuel subsidies is estimated to reduce global emissions by 37 gigatons (IISD 2017). Fossil fuel subsidies undermine many SDGs, while phasing them out frees up money to advance them (IISD 2019).

Such climate commitments should include short-term timelines or benchmarks to ensure the realization of longer-term climate targets [Warren 2020a]. Climate commitments with six-month deadlines have higher compliance than those with multiyear ones. The four commitments with a timetable of six months or less averaged 85% compliance. The one commitment with a multiyear timetable averaged only 43%.

Moreover, these four high-complying commitments came before key high-level UN climate summits. Commitments explicitly referencing the UNFCCC averaged 85%, while those that did not averaged only 65%. Specifically, climate commitments that came before UNFCCC summits had higher compliance than those that came after. This suggests that surrounding summit support in the lead-up to the periodic UNFCCC summits is a causal factor too.

The G20 should also institutionalize pre-summit environment and climate change ministerial meetings. Within the similar G7, such meetings correlate with higher compliance with its summit climate commitments. In the G20, the first meeting of environment ministers (held jointly with energy ministers) came at the 2019 Osaka Summit. This may have contributed to the solid 76% compliance with the two assessed climate commitments.

Synergies as a Cause of Compliance

The G20's highest compliance of 87% came on those climate commitments that referenced sustainable development [Warren 2020b]. Those referencing the G20's core focus of economic growth came second with 74%. Those referencing forests had 65%, the ozone layer 48% and clean energy 46%. Climate commitments that mobilized money had 60%. However, the sustainable development-climate change link, depending on how sustainable development is conceived, can erode and reverse progress on climate mitigation and adaptation. To guard against this, the G20 could be more specific, and link climate change specifically with SDG 13 on climate action.

G20 Governance of Digitization

Conclusions, Commitments and Compliance

On digitization, G20 governance of the digital economy began only in 2013 (Appendix F). However, siloed governance has been strong.

At Washington in 2008, G20 leaders did refer to ecommerce platforms. But the term "digital economy" did not appear until the St. Petersburg Summit in 2013. The first digital economy commitment came only at the Hangzhou Summit in 2016, where innovation was the summit theme (Williams 2019).

Overall, from 2008 to 2015, the G20 dedicated a total of 1,907 words to digitization, for a portion of the communiqués that never exceeded 3%.

The 2016 Hangzhou Summit started the G20's serious digitization governance, producing 3,042 words taking 19% of the communiqués. None of its 48 digital economy commitments were linked to climate change or the SDGs, despite digitization's clear ecological impacts. The four digitization commitments assessed for compliance were all on ensuring internet access to the digital economy. Each targeted a different aspect or actor to achieve this overarching goal, such as supporting small- and medium-sized enterprises. Compliance averaged only 57%.

The 2017 Hamburg Summit produced 5,029 words, for 4% of its communiqués, and 27 commitments on digitization. One commitment referenced sustainable development, and

two the SDGs. None referenced climate change. The one commitment assessed for compliance, which averaged 95%, did not reference sustainable development or the SDGs, but sought to develop the digital economy and ensure competition, investment and innovation.

The 2018 Buenos Aires Summit gave digitization 1,420 words for 17% of the communiqués, and 11 commitments. None linked to the SDGs or climate change. The two assessed for compliance averaged 74%. The one on free flow of data with trust had 55%, and the one on improving digital infrastructure had 93%.

The 2019 Osaka Summit gave digitization 1,265 words, for 19% of the communiqués, and now linked digitization to the SDGs. But its six commitments on digitization made no explicit links to the SDGs or climate change. Compliance averaged 67%. The commitment on data free flow with trust rose to 85%. The related one on digital taxation had 65%. That on terrorism with a digital component had only 50%.

Causes and Corrections

The low-cost accountability measures the G20 can employ to improve its digital compliance include making more commitments on the subject at the same summit, holding a pre-summit digital ministerial meeting and referencing the core international organization of the OECD in its digital commitments (Williams 2019).

Synergies as a Cause of Compliance

There were no explicit links to "climate change" or the "SDGs" in the G20's digital commitments. But an implicit but important link did appear when the G20 at Osaka made two references to smart cities, an area of work inextricably linked to both climate change and digitization. One of these references appeared in the section on climate change and one appeared in the section on digitization. The latter section also explicitly referenced the SDGs, directly linking the SDGs and artificial intelligence (AI). The smart cities commitment secured averaged 70% compliance.

The Riyadh Retreat, November 2020

At its most recent summit, at Riyadh on November 21-22, 2020, the G20 retreated from the limited attention to the three subjects and their synergies. It did very little to govern the SDG's, climate change or digitalization, and made no links among then. It was crowded out by COVID-19, another crisis that G20 leaders viewed as unlinked to sustainable development, climate change or digitalization. Each of the three subjects had few commitments, with not even a single bilateral link.

The Riyadh Summit's 107 commitments were led by health and crime-corruption, with 14 each, followed in turn by trade with 10, macroeconomic policy with nine, and gender with

eight. Then came development with seven. Far behind were climate change and the digital economy with only three each.

Only one of the seven development commitments refereed to the SDGs (See Appendix G). It was a low binding one, with no synergies. It read: **"**We remain resolved to play a leading role in contributing to the timely implementation of the 2030 Agenda for Sustainable Development and the Addis Ababa Action Agenda."

None of the three, all low binding, climate change commitments linked to development or digitalization. The only one with links chose the economy and energy instead. It read: "In advance of the United Nations Framework Convention on Climate Change (UNFCCC) COP26 in Glasgow…we reiterate our support for tackling pressing environmental challenges, such as climate change…as we promote economic growth, energy security and access for all, and environmental protection."

Yet the leaders did acknowledge in their communiqué conclusions "the importance of fostering synergies between adaptation and mitigation, including through nature-based solutions and ecosystem-based approaches."

Conclusion

The SDGs were explicitly designed to be synergistic, with each of the 17 directly supporting all the rest. The government leaders that launched them at the UN and supported them at the G20 are uniquely responsible, at home and abroad, for devising and delivering synergistic solutions that benefit all of them. G20 leaders also have an exceptional capacity, given their combined power, their strong performance on the SDGs, and their substantial performance on climate change and digitization at their Hamburg peak in 2017, and the emerging evidence that such synergistic commitments improve members' subsequent compliance with them.

In considering how they can strengthen these synergies to secure better compliance with co-benefits for all, they should start by crafting their commitments with the specific synergies that seem to work best. On development and thus sustainable development, they are those that "link development to the subjects at the classic and evolving core of G20 governance," which are economic ones (Dobson 2020). In 2017 the SDG-digital commitment had compliance of 88%. Moreover, "the highest compliance of 87% came on climate commitments linked to sustainable development [Warren 2020a].

The compliance enhancing impact of such synergies is confirmed and refined by compliance with the relevant Osaka Summit commitments up to October 10, 2010. On development, the three commitments that referenced the SDGs or sustainable development averaged compliance of 91%, or well above the Osaka Summit's all subject average of 78%. The first, linked to energy (a subject closely connected to climate change), averaged 88%. The second, linked to investment in human capital, averaged 93%. The third, linked to climate change financing, averaged 93%. A fourth, linking "resilient development" to climate change, averaged 78%.

On digitalization, the three referencing this term averaged compliance of only 67%. However the first, linking it to the economy, had 85%. The second, linking it to taxation, had 65%. However, the third, linking it to terrorism, had only 50%. This suggests the value of the link to the G20's traditional core subjects of the economy (Dobson 2020).

In all, compliance tends to be higher since 2016 with commitments on sustainable development and the SDGs, climate change or digitalization when they make synergistic links to one of the other subjects (or the energy companion of climate change), or more generally to economic subjects at the G20's traditional core. Yet this pattern is most pronounced at Hamburg in 2017 and Osaka in 2019, suggesting that other causes, concentrated in the host, were at work.

Together, the results from Osaka, the G20's most recent regular summit for which complete compliance data exist, suggest that sustainable development is the primary pillar on which high complying synergies should be built. They further suggest that climate change is the first synergistic link to make. They finally suggest that the G20 should start to forge a fully trilateral SDG-climate-digitalization link that could create high compliance to benefit all.

Such synergies are especially important in the resource constrained, COVID-19 world that suddenly started in 2020. Yet at the G20's March 26, 2020, emergency summit COVID-19 obliterated the attention to the SDGs, climate change and the environment, that Saudi Arabia first announced it would prioritize on December 1, 2019 its priorities for its Riyadh Summit on November 21-22, 2020. Riyadh did not make any of the synergistic links.

To restore the strength of the three silos, with a focus on the results that compliance brings, there are several other low-cost accountability measures that G20 leaders have used before and that have increased compliance here. On development and the SDGs, these are commitments that "use highly binding verbs that signal their collective political will, link development to the subjects at the classic and evolving core of G20 governance, and refer to their past summits" (Dobson 2020). On climate change, they are making fewer but more ambitious climate conclusions and commitments, mounting meetings of environment and climate change ministers, and commitments with strong politically binding language that references the UN Framework Convention on Climate Change and that stipulate timelines of six months or less (Warren 2020). On digitalization, they are making more conclusions and commitments on digitalization, "outlining clear expectations in less binding language" and by keeping up "with the rapid pace of digital innovation by reviewing current trends and innovations in digitalisation, to identify areas requiring regulation and policy change" (Williams 2020).

On this foundation, at their future summits, G20 leaders should restore the SDG's centrality and synergy, and integrate digitization, to help achieve the SDGs and cope with climate change and COVID-19 too. They can start by taking three steps.

First, they should mandate a focus on the SDGs and climate change at their subsequent summits. As an integral part, to overcome the COVID-19 crowd out, their focus on

COVID-19 should embrace all the targets and indicators of SDG 3 on health and explicitly link them to SDG 13 on climate change and its environmental companions. They should specify and stress how climate change contributes to COVID-19 cases and deaths, how protecting forests can help cure COVID-19 by potentially providing the raw material for vaccines, while respecting land rights, and how other nature-based solutions benefit both health and climate change control. Second, they should fully integrate digitization into them, both at the G20 and the UN. Third, they should hold a second annual G20 summit, at the opening of United Nations General Assembly in September in New York, to advance the SDGs and to fully integrate climate change and digitization into them.

The priorities that Italy as G20 host in 2021 announced at the start of its year provide a welcoming agenda for this (See Appendix H). Its 30 priorities include one specifically on the SDGs, two on climate change and three on digitization, with many others supportive of these silos and the synergies among all. Further propellers come from the replacement of a climate denying Donald Trump by a climate committed Joe Biden as U.S. president, the latter's hosting of a global Earth Day climate summit on April 22, 2021 and the pull of the long delayed UN climate summit on November 1-22, immediately after the Rome G20 Summit ends.

References

Bauer S., Berger A., Iacobuta G. (2020) With or Without You: How the G20 Could Advance Global Action Towards Climate-Friendly Sustainable Development. *Global Solutions Journal*, no 5, pp. 115–22. Available at https://www.global-solutions-initiative.org/wp-content/uploads/2020/05/GSJ_issue5_NEU.pdf (accessed 15 May 2020).
Bollrich E., Steinhilder J. (2020) Implementing the SDGs: On the Relationship Between Sustainable Development and the Global Commons. *Global Solutions Journal*, no 5, pp. 212–7. Available at https://www.global-solutions-initiative.org/wp-content/uploads/2020/05/GSJ_issue5_NEU.pdf (accessed 15 May 2020).
Dobson S. (2020) G20 Performance on Development. *G20 Saudi Arabia 2020: The Riyadh Summit* (J. Kirton, M. Koch (eds)). London: GT Media.

Fues T. (2017) Recalibrating the G20's Mission Toward Sustainable Development: Opportunities and Challenges for Germany's Presidency. *International Organisations Research Journal*, vol. 12, no 2, pp. 34–53. Available at: https://doi.org/10.17323/1996-7845-2017-02-34.

G20 Development Working Group (n.d.) Guiding Principles for the Development of Science, Technology, and Innovation for SDGs Roadmaps. Available at: https://www.mofa.go.jp/policy/economy/g20_summit/osaka19/pdf/documents/en/annex_12.pdf (accessed 15 May 2021).
Hallink C. (2019) G20 Performance on Development. *G20 Japan: The Osaka Summit* (J. Kirton, M. Koch (eds)). London: GT Media.

International Institute for Sustainable Development (IISD) (2017) Ending Fossil Fuel Production Subsidies Cuts Greenhouse Gas Emissions by 37 Gt over 2017–2050. Press Release, 12 February. Available at: https://www.iisd.org/articles/ending-fossil-fuel-production-subsidies-cuts-greenhouse-gas-emissions-37-gt-over-2017-2050 (accessed 15 November 2020).
International Institute for Sustainable Development (IISD) (2019) High-Level Political Forum on Sustainable Development: Selected Other Side Events Coverage for 10 July 2019. Earth Negotiations Bulletin. Available at: https://enb.iisd.org/hlpf/2019/side-events/10jul.html?utm_medium=email&utm_campaign=ENB%20Update%20%2010%20July%202019%20SW&utm_content=ENB%20Update%20%2010%20July%202019%20SW+CID_c9416492e87f44e1e9b8f1e49de1b6bf&utm_source=cm&utm_term=Read%20full%20coverage (accessed 15 November 2020).
Kharas H., Strauss S., Schmidt-Traub G., Rodriguez Tornquist R. (2018) Advancing the G20's Commitment to the 2030 Agenda. *Global Solutions Journal*, no 2, pp. 31–7. Available at: https://www.global-solutions-initiative.org/wp-content/uploads/2019/09/GlobalSolutionsJournal_2_E-Reader.pdf (accessed 15 May 2020).

Kirton J. (2019a) The G20's Future. *International Organisations Research Journal*, vol. 14, no 2, pp. 31–51. Available at: https://doi.org/10.17323/1996-7845-2019-02-02.

Kirton J. (2019b) G20 Governance for an Inclusive Liberal Order. C*hina Journal of International Review*, vol. 1, no 1, pp. 1–21. Available at: https://doi.org/10.1142/S2630531318500014.
Kirton J. (2020a) The United States' Cooperative Leadership in G7 and G20 Governance. *SAIS Review of International* Affairs, vol. 40, no 1, pp. 103–16. Available at: https://doi.org/10.1353/SAIS.2020.0009.
Kirton J. (2020b) G20 Governance of Globalization. *International Organisations Research Journal*, vol. 14, no. 2, pp.
Kirton J., Kokotsis E. (2015) *The Global Governance of Climate Change: G7, G20 and UN Leadership*. Farnham: Ashgate.
Kirton J., Larionova M. (eds) (2018) *Accountability for Effectiveness in Global Governance*. New York: Routledge.

Kirton J., Nikolaeva A. (2019) Causes of G20 Compliance: Institutionalization, Hegemony, Reciprocity or Clubs. *International Organisations Research Journal*, vol. 14, no 2, pp. 80–108. Available at: https://doi.org/10.17323/1996-7845-2019-02-04.

Kirton J., Warren B. (2018) G20 Governance of Digitalization. *International Organisations Research Journal*, vol. 13, no 2, pp. 16–40. Available at: 10.17323/1996-7845-2018-02-02.

Kirton J., Warren B. (2020) A Fragile First Step? G7 and G20 Governance of Climate Change, the Environment, Health and Indigenous Peoples. Paper prepared for the Annual Convention of the International Studies Association, Honolulu, 25–29 March. Available at https://www.g8.utoronto.ca/scholar/kirton-warren-isa-2020.pdf (accessed 15 May 2021).

Kirton J., Warren B. (2021) Engagement Groups Recommendations Realized in G20 Summits. *Global Solutions Journal*, no 6, pp. 29–36. Available at: https://www.global-solutions-initiative.org/210114_GS_journal_6.pdf (accessed 15 May 2021).

Larionova M., Kirton K. (2020) Global Governance After the COVID-19 Crisis. *International Organisations Research Journal*, vol. 15, no. 2, pp. 7–23. Available at: https://doi.org/10.17323/1996-7845-2020-02-01.

Lefton R., Light A., Weiss D. (2009) Lessons Learned From Copenhagen. Center for American Progress, 22 December. Available at: https://www.americanprogress.org/issues/green/news/2009/12/22/7011/lessons-learned-from-copenhagen/ (accessed 15 November 2020).

Li X., Zhou T. (2016) Achieving the Sustainable Development Goals: The Role for the G20 From China's Perspective. *China and World Economy*, vol. 24, no 4, pp. 55–72. Available at: https://doi.org/10.1111/cwe.12167.

Lustig N. (2018) The Sustainable Development Goals, Domestic Resource Mobilization and the Poor. *Global Solutions Journal*, no 2, pp. 190–7.

Organisation for Economic Co-operation and Development (OECD) (2020) Smart Cities and Inclusive Growth. Available at: https://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf (accessed 15 May 2021).

Ordonez A., Scholz I., Murillo F., Sharma G., Tanaka K., Yamada K., Hege E., Cavalli L. (2020) Improving the G20's Co-ordination of the Delivery and Monitoring of the 2030 Agenda. *Global Solutions Journal*, no 2, pp. 38–46. Available at: https://www.global-solutions-initiative.org/wp-content/uploads/2019/09/GlobalSolutionsJournal_2_E-Reader.pdf (accessed 15 May 2020).

Rapson J., Kirton J. (2020) Raising Compliance with G20 Commitments: Two Evidence Based Instruments. *Global Solutions Journal*, no 5, pp. 224–33. Available at https://www.global-solutions-initiative.org/wp-content/uploads/2020/05/GSJ_issue5_NEU.pdf (accessed 15 May 2020).

Steiner A. (2020) A Critical Moment. *Saudi Arabia 2020: The Riyadh Summit* (J. Kirton, M. Koch (eds)). London: GT Media.

Warren B. (2020a) G20 Governance of Climate Change Through Nature-Based Solutions. *Global Solutions Journal*, no 5, pp. 135–45. Available at https://www.global-solutions-initiative.org/wp-content/uploads/2020/05/GSJ_issue5_NEU.pdf (accessed 15 May 2020).

Warren B. (2020b) G20 Performance on Climate Change. *Saudi Arabia 2020: The Riyadh Summit* (J. Kirton, M. Koch (eds)). London: GT Media.

Williams M. (2019) G20 Performance on the Digital Economy. *Saudi Arabia 2020: The Riyadh Summit* (J. Kirton, M. Koch (eds)). London: GT Media.

Appendix A: SDG Progress, Pre- and Post-COVID-19

Progress Pre Covid-19

Greatest Progress since 2015

By SDG:
SDG 1 No Poverty
SDG 9 Industry, Innovation and Infrastructure

By Country Group:
East and South Asia
Low- and middle-income countries

Slow Progress of Reversals Pre Covid-19

SDG 02 Zero Hunger
SDG 15 Life on Land

Progress Post Covid-19 (Short Term)

SDG 12 Responsible Consumption and Production
SDG 13 Climate Action
SDG 14 Life Below Water
SDG 15 Life on Land

Reversed Progress Post Covid-19

SDG 1 No Poverty
SDG 2 Zero Hunger
SDG 3 Good Health and Wellbeing
SDG 4 Quality Education
SDG 5 Gender Equality
SDG 8 Decent Work and Economic Growth
SDG 10 Reduced Inequalities

Source: Data from the SDG Index score and a private communication from UNDP, October 3, 2020

Appendix B: G20 Summit Communique Conclusions on the SDGs

Year	# Words	% Total Words	# Paragraphs	% Total Paragraphs	# Documents	% Total Documents	# Dedicated Documents
2008 Washington	0	0	0	0	0	0	0
2009 London	0	0	0	0	0	0	0
2009 Pittsburgh	0	0	0	0	0	0	0
2010 Toronto	0	0	0	0	0	0	0
2010 Seoul	0	0	0	0	0	0	0
2011 Cannes	0	0	0	0	0	0	0
2012 Los Cabos	0	0	0	0	0	0	0
2013 St. Petersburg	0	0	0	0	0	0	0
2014 Brisbane	0	0	0	0	0	0	0
2015 Antalya	452	3.2	4	1.1	3	50	0
2016 Hangzhou	527	3.2	4	0.6	2	50	0
2017 Hamburg	4138	12	63	3.7	7	70	1
2018 Buenos Aires	240	2.8	1	0.5	1	50	0
2019 Osaka	819	12.3	7	7.2	1	50	0
2020 March 26 Summit	0	0	0	0	0	0	0
Total	**6176**	**33.5**	**79**	**13.1**	**14**	**270**	**1**
Average	**441**	**2**	**6**	**1**	**1**	**19**	**0**

Notes:
Compiled by Duja Muhanna (2008 - 2020), G20 Research Group, September 27, 2020
Data are drawn from all official English-language documents released by the G20 leaders as a group. Charts are excluded.
"# of Words" is the number of SDG-related subjects for the year specified, excluding document titles and references. Words are calculated by paragraph because the paragraph is the unit of analysis.
"% of Total Words" refers to the total number of words in all documents for the year specified.
"# of Paragraphs" is the number of paragraphs containing references to "sustainable development goals" (SDGs) for the year specified. Each point is recorded as a separate paragraph.
"% of Total Paragraphs" refers to the total number of paragraphs in all documents for the year specified.
"# of Documents" is the number of documents that contain SDG subjects and excludes dedicated documents.
"% of Total Documents" refers to the total number of documents for the year specified.
"# of Dedicated Documents" is the number of documents for the year that contain an SDG related subject in the title.

Appendix C: G20 Sustainable Development Goal Commitments: 2015-2019

Core subject	Total	2015 Antalya	2016 Hangzhou	2017 Hamburg	2018 Buenos Aires	2019 Osaka
Development	60	3	7	35	1	14
Climate change	14	1	1	10	1	1
Food and agriculture	17		2	15		
International cooperation	2			2		
Energy	10			10		
Migration and refugees	7			7		
Macroeconomic policy	12			12		
Financial regulation	13			13		
ICT	13			13		
Trade	17			17		
Gender	6			6		
Labour and employment	14			13		1
Crime and corruption	22			22		
Health	8			8		
Environment	3			3		
Infrastructure	6			6		
Social policy	2			2		
Microeconomic policy	1			1		
IFI reform	6			6		
Digital economy	2			2		
Total	235	4	10	203	2	16

NOTES

Compiled by Brittaney Warren, October 2, 2020

Inclusion terms: SDGs/Sustainable Development Goals, 2030 Agenda, sustainable development

Commitments included in this list that explicitly exclude these terms were included because they fell under a sub-heading or section dedicated exclusively to the SDGs/2030 Agenda.

Development commitments that did not explicitly include the inclusion terms are not in this list.

Excluded from the list below [ADD?] Addis Ababa Action Agenda, financing for development, African Union's Agenda 2063

Appendix D: G20 Compliance with Development and SDG Commitments

Summit	Number of development commitments	Compliance	Number assessed	Number of SDG commitments	Compliance	Number assessed
2008 Washington	4	+0.80 (90%)	1	-	-	-
2009 London	15	+0.15 (58%)	2	-	-	-
2009 Pittsburgh	9	+0.10 (55%)	3	-	-	-
2010 Toronto	8	+0.35 (68%)	3	-	-	-
2010 Seoul	22	+0.27 (64%)	20	-	-	-
2011 Cannes	17	+0.33 (67%)	2	-	-	-
2012 Los Cabos	10	+0.78 (89%)	3	-	-	-
2013 St. Petersburg	50	+0.04 (52%)	4	-	-	-
2014 Brisbane	20	+0.28 (64%)	3	-	-	-
2015 Antalya	34	+0.28 (64%)	3	4	0 (50%)	1
2016 Hangzhou	20	+0.85 (93%)	1	10	+0.85 (93%)	1
2017 Hamburg	75	+0.34 (67%)	4	203	+0.85 (93%)	2
2018 Buenos Aires	4	+0.45 (73%)	1	2	n/a	0
2019 Osaka*	24	+0.65 (83%)	2	16	+0.80 (90%)	2
Total	312	+0.32 (66%)	52	235	+0.63 (82%)	6

Notes: Compiled by Brittaney Warren, October 6, 2020.
no development commitments were made at the 2020 Extraordinary Virtual Leaders' Summit
Number of SDG commitments: 60 of these commitments are core development commitments. The remaining fall under other core subjects, such as climate change and food and agriculture. These were included as they referenced either SDG, 2030 Agenda or sustainable development explicitly, or they appeared in a document dedicated to the SDGs (i.e. the document "2030 Agenda" from the 2017 Hamburg Summit).
*2019 Osaka score is un-confirmed interim compliance score (as of 201006)
n/a = not available

List of assessed sustainable development commitments:
2015-67: Our G20 National Remittance Plans developed this year include concrete actions towards our commitment to reduce the global average cost of transferring remittances to five percent with a view to align with the SDGs and Addis Ababa Action Agenda. (development) 0

2016-112: By endorsing the G20 Action Plan on the 2030 Agenda for Sustainable Development which also includes high-level principles, we reaffirm our commitment to achieve the ambition of the 2030 Agenda. (Issue-Area: Development) +0.85

2017-81: We commit to further align our actions with the 2030 Agenda for Sustainable Development, domestically and internationally, including in support of developing countries and the provision of public goods. (development) +0.75

2017-197: Strengthen digital and financial literacy and capability. (development) +0.75

2019-91: [We support developing countries in their efforts to advance progress towards the timely implementation of the SDGs in such areas as]…energy…[using all means of implementation, such as the mobilization of private sector resources and capacity building assistance.] (development) +0.75 preliminary final

2019-97: We reaffirm our commitment to invest in human capital…[as emphasized in the G20 Initiative on Human Capital Investment for Sustainable Development.] (development) +0.85 preliminary final

Appendix E: G20 Performance on Climate Change

Summit	Domestic political management		Deliberation		Direction setting					Decision making	Delivery		Development of global governance			
	Compliments		Words								Commitments		Inside		Outside	
	#	%	#	%	Financial stability	Globalization for all	Priority placement	Democracy	Human rights	# commit-ments	Score	% assessed	Minis-terial	Official level	# references	# bodies
2008 Washington	0	0%	64	1.7	0	0	0	0	1	0	-	-	0	0	0	0
2009 London	0	0%	64	1.0	0	0	1	0	0	3	−0.10 (45%)	33% (1)	0	0	1	1
2009 Pittsburgh	1	5%	911	9.7	0	0	4	0	0	3	+0.86 (93%)	33% (1)	4	0	10	5
2010 Toronto	1	5%	838	7.4	0	0	0	1	0	3	+0.42 (71%)	100% (3)	0	0	3	3
2010 Seoul	2	10%	2,018	12.7	0	0	2	1	0	8	+0.05 (53%)	50% (4)	5	3	20	11
2011 Cannes	2	10%	1167	8.2	0	0	0	1	0	8	+0.38 (69%)	37% (3)	2	0	11	7
2012 Los Cabos	0	0%	1,160	9.1	0	0	0	1	0	6	+0.59 (80%)	50% (3)	1	5	6	5
2013 St. Petersburg	1	5%	1,697	5.9	0	0	1	0	0	11	-0.17 (42%)	27% (3)	0	3	10	7
2014 Brisbane	0	0%	323	3.5	0	0	0	0	0	7	+0.51 (76%)	71% (5)	0	0	4	2
2015 Antalya	0	0	1,129	8	0	0	0	0	0	3	+0.70 (85%)	85% (1)	1	1	5	3
2016 Hangzhou*	0	0	1,754	11	0	1	0	1	0	2	+0.58 (79%)	100% (2)	1	3	5	4
2017 Hamburg	0	0	5,255	15	0	0	1	1		22	+0.42 (71%)	23% (5)	0	11	26	9
2018 Buenos Aires	0	0	532	6	0	0	0	0	0	3	+0.57 (79%)	79% (2)	0	0	3	3
2019 Osaka	0	0	2034	31	1	1	0	0	0	13	+0.78 (89%)	15% (2)	1	1	10	9
Total	7	n/a	18,946	n/a	1	2	9	5	2	92	n/a	31	15	27	114	69
Average	0.78	4%	1,353	9.3	0.1	0.1	0.88	0.4	0.1	6.6	+0.47 (74%)	69%	1.1	1.9	8.1	4.9

Notes: Domestic Political Management includes all explicit references by name to the full members of the Summit that specifically express the gratitude within the context of climate change of the institution to that member. The % of members complimented indicates how many of the 20 full members received compliments within the official documents, depending on how many full members there were that year.
Deliberation to number of times climate change is referenced in the G20 leaders' documents for the year in question. The unit is the paragraph. % refers to the percentage of the overall number of words in each document that relate to the climate change.
Direction Setting, as Priority Placement refers to the number of times climate change is referenced in the chapeau or chair's summary for the year in question. The unit of analysis is the sentence. The number in parenthesis refers to environment references. Democracy refers to the number of times there was a reference to democracy in relation to climate change. Human rights refers to the number of times there was a reference to human rights in relation to climate change. The unit of analysis is the paragraph.
Decision Making refers to the number of climate change commitments. Delivery refers the overall compliance score for climate change commitments measured for that year. % Assessed represents percentage of commitments measured. The numbers in parenthesis refer to energy commitments.

Development of Global Governance. Inside refers to the number of references to institutions inside the G20 made in relation to climate change. Ministerial refers to ministerial groups. Official Level refers to official level groups. Outside refers to the number of external multilateral organizations related to climate change. The unit of analysis is the sentence.

*2016 Hanzghou Communiqué reference to climate change-GGA: "We are determined to foster an innovative, invigorated, interconnected and **inclusive** world economy to usher in a new era of global growth and sustainable development, taking into account the 2030 Agenda for Sustainable Development, the Addis Ababa Action Agenda and the **Paris Agreement**.

Appendix F: G20 Performance on Digitalization

Year	DPM		DEL			DIR				DEC		DEL		DGG	
			Words												
	Att	CC	#	%	Doc	FS	GFA	DEM	HR	# of CMT	% Overall	Compliance	# Measured	IN	OUT
2008W	100	0	88	2	0	1	0	1	0	0	0	n/a	n/a	0	0
2009L	100	0	0	0	0	0	0	0	0	0	0	n/a	n/a	0	0
2009P	100	0	289	3.1	0	7	0	2	0	0	0	n/a	n/a	1	1
2010T	100	0	229	2.1	0	2	0	1	0	0	0	n/a	n/a	0	0
2010S	100	0	0	0	0	0	0	0	0	0	0	n/a	n/a	0	0
2011C	95	0	372	2.6	0	4	0	0	0	1	0.4	-	-	0	7
2012LC	95	0	169	1.3	0	2	0	0	0	0	0	n/a	n/a	1	1
2013SP	95	0	760	2.6	0	0	2	0	0	0	0	n/a	n/a	7	6
2014B	90	0	0	0	0	0	0	0	0	0	0	n/a	n/a	0	0
2015A	90	0	299	2.2	0	2	1	0	2	1	0	n/a	n/a	0	1
2016Hz	95	0	3042	18.8	0	12	35	11	1	29	13.7	+0.14	4	27	32
2017Hg	95	0	5029	14.8	0	18	77	8	1	25	4.7	+0.90	1	37	31
2018BA	90	0	1420	16.7	0	4	7	0		11	5.3	+0.70	1	3	8
2019O	95	1*	1,265	19	1	0	2	n/a	n/a	6	4	+0.10	2	56	54
Total	1340	0	12962	-	1	52	124	23	4	73	-	-	8	132	141
Average	95.7	0.0	925.9	6.1	0.1	3.7	8.9	1.8	0.3	5.2	2.0	+0.46	-	9.4	10.1

Notes: DPM: Domestic Political Management – measured by the number of leaders in attendance (Att.) and communiqué compliments (CC), the number of times a country or leader was positively mentioned
DEL: Deliberation – measured by the number of words on the subject (#), the percent (%) of words and the number of dedicated documents to the issue (Doc.)
DIR: Direction setting – measured by the number of references to the G20 financial stability principle (FS) and globalization for all (GFA), and the G8 democratic principles (Dem) and the number of references to human rights (HR)
DEC: Decisions – measured by the number of commitments (CMT) and the percentage of overall commitments (% overall)
DVY: Delivery – measured by compliance with priority commitments (Cmp) and the number of compliance reports (# measured)
DGG: Development of Global Governance – measured by the number of governance mechanisms developed within the G20 (IN) and the number of governance mechanisms developed outside of the G20 (OUT)
Overall: Overall grade.
n/a = not applicable; - = no commitment assessed
One related digitization commitment was assessed in 2015 on the digital divide with compliance at +0.10. Added to the four commitments assessed from 2016, compliance is 0 or 50%.
**Compliment to Japan: "We share the notion of a human-centered future society, which is being promoted by Japan as Society 5.0"
n/a: not available
*DGG: counts leaders' declaration only (need to add other documents)
Average compliance score includes core digital commitments only, excludes related digital commitments

Appendix G: Riyadh Commitments on Development, Climate & Digitalization

Development (7)

2020-15: We are committed to implementing the Debt Service Suspension Initiative (DSSI) including its extension through June 2021, allowing DSSI-eligible countries to suspend official bilateral debt service payments.
2020-16: We will continue to closely coordinate its ongoing implementation to provide maximum support to DSSI-eligible countries.
2020-17: we endorse the "Common Framework for Debt Treatments beyond the DSSI"
2020-65: [We endorse the]…the Financing for Sustainable Development Framework.
2020-**66: We remain resolved to play a leading role in contributing to the timely implementation of the 2030 Agenda for Sustainable Development** and the Addis Ababa Action Agenda.
2020-67: We are determined to support African countries in overcoming the crisis, including by exploring more sustainable financing options for growth in Africa.
2020-68: We reiterate our continued support for the G20 Initiative on Supporting the Industrialization in Africa and LDCs, G20 Africa Partnership and the Compact with Africa, and other relevant initiatives.

Digital Economy (3)

2020-49: We support fostering an open, fair, and non-discriminatory environment, and protecting and empowering consumers, while addressing the challenges related to privacy, data protection, intellectual property rights, and security.
2020-50: We will continue to promote multi-stakeholder discussions to advance innovation and a human-centered approach to Artificial Intelligence (AI), taking note of the Examples of National Policies to Advance the G20 AI Principles.
2020-72: We also endorse the G20 High-level Policy Guidelines on Digital Financial Inclusion for Youth, Women, and SMEs prepared by the Global Partnership for Financial Inclusion (GPFI).

Climate Change (3)

2020-101: We endorse the Circular Carbon Economy (CCE) Platform, with its 4Rs framework (Reduce, Reuse, Recycle and Remove), recognizing the key importance and ambition of reducing emissions, taking into account system efficiency and national circumstances.
2020-102: In advance of the United Nations Framework Convention on Climate Change (UNFCCC) COP26 in Glasgow…we reiterate our support for tackling pressing environmental challenges, such as climate change…as we promote economic growth, energy security and access for all, and environmental protection.
2020-104: Signatories to the Paris Agreement who confirmed at Osaka their determination to implement it, once again, reaffirm their commitment to its full implementation, reflecting common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.

Appendix H: G20 Rome Summit Host Priorities 2021

A. People (6)
1. Eradicate poverty per SDG 1
2. Tackle inequality
3. Protect most vulnerable: young, precarious workers, SMEs
4. Promote women's empowerment
5. Ensure universal access to education
6. Redistribute opportunities, reduce disparities among regions

B. Planet (11)
7. Climate change
8. Land degradation
9. Biodiversity loss
10. Achieve SGS of Agenda 2030
11. Transition to renewable energy
12. Transition to a green recovery
13. Focus on modern smart cities
14. New tools for sustainable urbanization
15. New tools for energy efficiency
16. New tools for improved, modern mobility
17. Pave way to COP 26

C. Prosperity (13)
18. Re-ignite growth
19. Renewed prosperity
20. Make digitalization an opportunity for all
21. Reduce the digital divide
22. Promote infrastructure to guarantee universal internet access
23. Achieve adequate, widespread digital literacy
24. Exploit full potential of the technological revolution
25. Make health services effective
25. Facilitate data sharing for global pandemic preparedness and response
26. Enhance flexible working modules
27. Redistribute unpaid care work between genders
28. Promote work-life balance for men and women
29. Improve efficiency of energy distribution networks and grids
30. Enhance reach of educational activities

Identified by John Kirton
Source: Italy's G20 host's summit webpage