
IASS WORKSHOP SUMMARY

Institute for Advanced Sustainability Studies (IASS)

Global Sustainability Strategy Forum

**Science and Business: Working Together for
Sustainability**

Workshop Summary

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Summary

How can science and business help build sustainable societies? This question took centre-stage at the second Global Sustainability Strategy Forum (GSSF), held on 22 – 24 March 2020. The event did not take place in Bangkok as previously planned due to the coronavirus pandemic. Instead, 25 leading experts from business and sustainability science came together online to discuss how the two sectors could work together more effectively.

Discussions at the GSSF revolved around three guiding questions developed ahead of the event by Ortwin Renn, Ilan Chabay, Solène Droy (all Institute for Advanced Sustainability Studies IASS) and Sander van der Leeuw (Arizona State University ASU):

1. How can academic research in sustainability science converge effectively with corporate sustainability strategies to design feasible, effective, and fair transformation pathways harmonizing both corporate and societal needs? What are recent examples of such collaboration and what can we learn from them?
2. What are common priorities on which both the scientific and business communities should focus over a 5 – 10 year period and over the longer term?
3. What institutional frameworks and structures at the local to regional scales would best support cooperation between sustainability scientists and business leaders to facilitate necessary transformations?

Two days of intense discussions delivered the following results:

There are three intertwined concepts for the changes that are taking place as we move towards sustainability: transition, transformation and transgression. Transition implies that changes are emerging independent of the will and activities of the actors; transformation refers to the concept of actively designing and shaping the future towards sustainability; transgression denotes disruptive change. As a powerful actor with global reach, the business community plays a particularly important role in transformations towards sustainability. However, further research is needed to better understand the role of these three concepts for a sustainable future.

Three paradigms illustrate the possible role of business in sustainable development:

- In the first, we maintain our current modes of production and consumption patterns and try to minimize costs to the environment and society while maintaining current consumption levels to the extent possible (example: energy-efficient vehicles).
- In the second paradigm, we change the mode of production to include major innovations in the supply of goods and services, but keep demand more or less constant (example electric car, video conferencing instead of travelling).
- In the third, we rethink demand and go back to the roots of the demand – needs and wants – to align the production and distribution of goods and services with new value priorities and sustainable lifestyles (examples: changes in mobility behaviour, less air travel, greater use of bicycles and public transport).

Which of these three paradigms are applied to advance transitions towards sustainability will vary across sectors, regions and cultures. In each case, their success will rest on new forms of cooperation between scientists, engineers, decision-makers in the business community, regulators, NGOs and society.

The present Covid epidemic was also at the heart of the discussions of this Workshop and in particular the question of the lessons to be drawn from this crisis for the cooperation between science and business in order to build sustainable societies.

For example, the theme of investing in resilience and thinking resilience forward or the need to redirect value priorities and not simply opposing them to business or economic activities were some important points developed by the participants.

There is an obvious parallel between the current Pandemic and the Sustainability Crisis. The current sustainability crisis is not only an environmental but a societal one. The task of society is to enable people to live within the dynamics that govern our environment. Currently, society is no longer up to that task. As a result of an accumulation of unintended consequences of collective decisions made in the past, its institutions are overwhelmed and are no longer able to deal with the dynamics societies have generated. They predominantly make short-term decisions rather than design a strategy that deals with the longer-term issues. If the world does not profoundly change its values to deal with the sustainability conundrum, when we encounter other pandemics, financial crises, etc., we will again be thrown into a devastating crisis affecting the lives of millions worldwide.

Contents

1.	Introduction and Workshop Objectives	6
1.1	Starting Points for the Workshop.....	6
1.2	Framing of the Forum.....	6
1.3	Science and Sustainability in a historical and cultural perspective.....	8
1.4	Workshop Structure.....	9
2.	Sustainability of business or business for sustainability?	11
2.1	What is a sustainable Business?.....	11
2.2	What is Sustainability of Society?	11
2.3	Business for Sustainability	12
2.4	Implications for a Sustainability Strategy.....	12
3.	Key ideas and insights emerging from the Workshop	14
3.1	Basic Insights on the Interactions between Business and Academia	14
3.2	Insights from the Discussions on Principles of Cooperation between Academia and the Private Sector	16
3.3	Models for Cooperation	17
3.4	Lessons from the Covid-19 Crisis	18
4.	Annex: Answers to the questions sent by the participants prior to the workshop	20
4.1	Question 1: How can academic research in sustainability science converge effectively with corporate sustainability strategies to design feasible, effective, and fair transformation pathways harmonizing both corporate and societal needs? What are recent examples of such collaboration and what can we learn from them?	20
4.2	Question 2: What are common priorities on which both the scientific and business communities should focus in a 5-10 year period, as well as in a longer-term perspective?	25

4.3	Question 3: In local to regional scales, what institutional frameworks and structures would best support sustainability scientists and business leaders working together to facilitate the necessary transformations?	29
5.	About the Authors and Acknowledgements	32
5.1	Authors.....	32
5.2	Acknowledgements	32

1. Introduction and Workshop Objectives

1.1 Starting Points for the Workshop

Our Society still faces a gap between knowledge, goals and actions when it comes to the implementation of sustainable practices.

Providing causal and functional knowledge is not enough to support transformations towards sustainable practices. However, absence of knowledge is also not helpful for initiating successful transformations. There is a need for an effective bridge between systematic knowledge, sound experiences and socio-political actions under the conditions of diverse social and cultural contexts.

This includes better and more productive relationships between science, politics, business and civil society: What kind of knowledge is crucial for transformations and how can social actors, in particular knowledge providers, design knowledge and orientation that have an impact?

This workshop was focused on science and business: how can they better interact and support each other? What is needed, what is not needed and what is desirable? To do this the workshop organizers have formulated three orientation questions that were designed to inform and structure the discussions:

- How can academic research in sustainability science converge effectively with corporate sustainability strategies to design feasible, effective, and fair transformation pathways harmonizing both corporate and societal needs? What are recent examples of such collaboration and what can we learn from them?
- What are common priorities on which both the scientific and business communities should focus in a 5-10 year, as well as in a longer-term, perspective?
- At local to regional scales, what institutional frameworks and structures would best support sustainability scientists and business leaders working together to facilitate the necessary transformations?

The main objectives of the workshop were:

- To produce a set of suggestions based on the three questions,
- To accomplish a better understanding of different contexts (business type, region, culture) and how these contexts interfere with actions for sustainability, and
- To articulate proposals for better models and protocols for cooperation between science and business.

1.2 Framing of the Forum

Working together as science and business, we need to identify and learn to operate the leverage

points that can bring about substantive change in critical factors and thus move all sectors and components of society toward sustainable futures with justice and equity. We need also to understand, acknowledge, and manage the different expectations of the business leaders and the scientists, if we are to build a meaningful and sustained collaborative process.

What are the levers, incentives, and motivators for constructive movement and what are the barriers, disincentives, and diversions that hinder us? Who are the key actors (institutions, policy makers, trade associations, agencies) that are or could act on those levers, incentives, motivators? What limits the needed degree of temporal and spatial scaling up or replication?

How do we shape and activate strategies that address the long-term systemic risks and opportunities, not only reacting to immediate ones? Science and business have separately and jointly developed tools for long range projection (e.g., scenario building), but these have largely been more narrowly focused on specific technologies and sectors. We need a more comprehensive approach that adequately considers the deep complexity of social, ecological, and economic interdependencies. This is distressingly apparent in the current Covid-19 crisis with its direct and devastating impact on the health of so many people worldwide and on businesses, governments, and cultures. It has also made even more evident how little of the inherent complexity of a pandemic with its exponential growth was (and for some still is) understood by civil society and people in position to make policies and take adequate precautions. The science and its implications for global health and businesses were known, but not applied in many places until far too late, And this despite prior examples of such a phenomenon with exponential growth and multiple cascading disasters. Failing to act on plausible warnings of a pandemic exacerbated the problem by not anticipating and building capacity to respond in time and at an adequate scale. Responding to plausible warning of catastrophic risks allows time to build capacity for what some have called a “resilience dividend” that increases economic and social value in the process. Will the current crisis help move us toward accepting the short-term costs without ignoring or excluding the cost and return on investment of designing for the future?

When immediate reaction to a crisis is necessary, how can we manage that reaction and yet also reconsider and iteratively redesign it at critical moments to avoid locking in path dependencies that may run counter to long-term strategies?

Business and science have complementary strengths and insights that can be brought to bear collaboratively, rather than separately, whether in a more informal workshop or in formal working groups or institutions. These strengths tend to operate on different time scales and in different economic structures. These can be complementary, but perhaps more important is that deeper collaboration on jointly identified issues may lead to usefully blurring the time boundaries that each have been focused on previously.

Collaboration in substantive ways between business and science must be built upon the requirement for a strong ethical boundary that ensures independence and intellectual freedom to work toward jointly and transparently declared goals. This could encourage funding agencies to support initiatives that focus on issues and people-centered solutions identified and monitored by science and implemented with business.

Enormous increases in computational power, massive amounts of data, and applications of Artificial Intelligence and neural networks allow analyses in nearly real-time, but also require creativity, innovation, and judgement to interpret the output and develop ways to apply it ethically across multiple boundaries. In this, the collaboration between businesses, government and regulatory institutions, civil society, and science is essential.

1.3 Science and Sustainability in a historical and cultural perspective

Some remarks about crises in general: If sufficiently widespread – as the sustainability conundrum will be – a crisis will profoundly affect the societies involved. The 14th century epidemics of the plague, for example, have led to the origins of scientific research, as illustrated by students digging up skeletons for medical investigation in Montpellier. This initiated a movement by which people began to distinguish between living and non-living phenomena, in which the latter became subject to research. In part that was due to a reconceptualization of life and death, from a cyclical phenomenon (death as part of life and vv.) to a linear one (death ends life). Other related phenomena are an increased focus on individuals (signatures, portraits), a different perception of time (clocks) and (somewhat later) a change from a geocentric to a heliocentric vision of the world.

The current world is coming to an end (Vogel), we are all (everyone, scientists, businesses, etc.) in complete darkness about the outcome of such crises, as is currently illustrated by the debates about the outcome of the Covid-19 crisis. Moreover, a lesson from that crisis is that, if the world does not profoundly change its values to deal with the sustainability conundrum, we may well encounter other pandemics, financial crises, etc. We need ‘mortal humility’ in the face of what is happening.

Many people are in denial, ignoring the signs of social and natural crisis out of a desire to view our current world as ‘stable’ – seeing the future as ‘more of the same’. There are many psychological and cognitive mechanisms promoting that, but the world is changing at such a rate that this is no longer possible. We have to begin designing for change rather than for resilience.

Enabling continuity or resilience of our current lifestyle is, in the developed nations, what much sustainability science has been about up to now: maintaining that lifestyle while reducing its negative impact. Crises are when innovation has traditionally occurred in human societies. But at this point technological innovation are not the solution, at best, it is only part of the response that we can design for addressing these challenges, and we need to drill deeper into the societal dynamics that have brought us to the current point.

To do so, we need to see the crisis as endogenous: it is not an environmental crisis, but a societal one. The task of society is to enable people to live within the dynamics that govern our environment. Currently, society is no longer up to that task. As a result of an accumulation of unintended consequences of collective decisions made in the past, its institutions are overwhelmed and are no longer able to deal with the dynamics societies have generated. They predominantly make short-term decisions rather than design a strategy that deal with the longer-term issues. This has negative consequences.

The ICT revolution has fuzzed the distinction between signal and noise, so that there is an erosion of basic values under the impact of a cacophony of ‘alternative truths’. This is eroding the efficiency of our basic institutions at all levels (international relations, democracy, local communities). We need to rebuild such values and institutions with the help of the IT tools that are now available. In doing so, we need to combine bottom-up and top-down (society, scientists, business people, government).

For all of us it is difficult to know what to do. What is the future role of existing institutions and forms of business and academia. Much will depend on experimentation and, especially, education. Major attention needs to be devoted to the developing world, where novel ideas are blossoming, and poverty is endangering the majority of the world population.

1.4 Workshop Structure

The Second Global Sustainability Strategy Forum (GSSF) has been designed to be a mutual learning dialogue to develop common strategic grounds between leaders in business and sustainability science for moving urgently to just and equitable sustainable futures.

This workshop focused on science and business: how can both communities better interact and support each other? What is needed, what is not needed and what is desirable?

The participants in the Workshop were:

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The moderators were of the Workshop were:

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Sander van der Leeuw, Foundation Professor in the School of Human Evolution and Social Change and Distinguished Sustainability Scientist at the School of Sustainability at Arizona State University, USA

A keynote introduction was presented by:

Anand Patwardhan, Professor, University of Maryland, School of Public Policy, USA, India

Discussions at the GSSF revolved around three guiding questions developed ahead of the event by the four moderators:

1. How can academic research in sustainability science converge effectively with corporate sustainability strategies to design feasible, effective, and fair transformation pathways harmonizing both corporate and societal needs? What are recent examples of such collaboration and what can we learn from them?
2. What are common priorities on which both the scientific and business communities should focus over a 5 – 10 year period and over the longer term?
3. What institutional frameworks and structures at the local to regional scales would best support cooperation between sustainability scientists and business leaders to facilitate necessary transformations?

2. Sustainability of business or business for sustainability?

2.1 What is a sustainable Business?

What will the conversation with the private sector reveal in terms of a better strategy for sustainability? Where we need to look is not only for tools and methods but pose more fundamental questions about purpose and objectives.

We have deliberately framed the title of part 2 in this way – the academic and practice communities in business and management are concerned about the sustainability of business and look at different indicators and attributes. Over time, these attributes have expanded beyond just profits (maximizing shareholder value) to recognizing that there are other stakeholders and other interests such as customers, employees and the society at large.

However the sustainability community is more interested in the question of how we can ensure that business activity contributes positively to sustainability for society (and not negatively). This is important because the private sector or business & markets is the means by which society meets its needs. But this also means that we need to think through what sustainability means for society and the role of business in that process.

Conventional metrics (such as growth or shareholder value) individually or collectively are often regarded as indicators of sustainability of business in the management literature, but they may not have much relevance for – or even be related to the question of sustainability for society.

2.2 What is Sustainability of Society?

The most common definition is the one developed by the Brundtland Commission. Most of the literature around business and sustainability explores the question of *how* needs are being met – and how we could reduce the negative externalities associated with meeting those needs, through a variety of environmental policy instruments, or through voluntary efforts.

There is also a substantial literature exploring the implications of the weak form of sustainability that allows for a degree of substitutability between natural, human and technological / manufactured capital – i.e. how can we improve our overall capabilities – so that we leave future generations with improved abilities to meet their own needs.

There is, however, not as much literature on the more fundamental questions of *whose* needs are we trying to meet – and how those needs are defined. This brings questions of values & preferences (what do we mean by “a good life”, for example) as well as political economy questions of power - who gets to define the “good life”, which brings up the question of the role of business in constructing or defining needs.

2.3 Business for Sustainability

We could therefore think of the role of business for sustainability at four levels, starting from the simplest and most obvious, which is meeting market demands while avoiding or limiting negative consequences. The bulk of the literature in business & sustainability is at this level, which includes literature on cleaner production and environmental management. This literature has demonstrated that cleaner production is not necessarily more expensive and there could be good business reasons for firms to go “beyond compliance”. Other emerging ideas at this level include biologically inspired production models that could be inherently “cleaner”.

The second level is to go beyond the “factory gate”, into questions of product design, and considerations of product end-of-life through concepts such as product stewardship. Design for recyclability or remanufacture tries to bring in end-of-life into the design phase. Tools such as Life Cycle Assessment allow for the examination of product choices from cradle to grave. Emerging ideas at this level include concepts such as biosimilars or biomimicry; where we may find biological substitutes that have a smaller environmental footprint or that are easier recycled or degraded (such as compostable plastics). The business linkage comes through the idea of product innovation – and competitive advantage through product differentiation. The “circular economy” is a popular concept that straddles the first two levels. And even before the “circular economy” we have had “industrial ecology”.

The third level starts by recognizing that the demand vector, in fact, is not exogenous. And it is not enough to say that all business is doing is meeting exogenous demand in a more sustainable way. Rather, we need to consider the role of business in actively creating and shaping demand through tools such as advertising and marketing. To what extent are consumers making informed choices in the marketplace and what is informing those choices? Emerging trends at this level include the ideas of sustainability standards (labels, for example) that could reshape consumer preferences. Or even business model innovation where we could, for example, replace the product (washing machine or car) by a service (laundry or shared mobility service). Modal shifts towards public transport, and social / political choices that emphasize walking or bicycling reflect changing values and preferences and ultimately demand for different products and services. At this level, we are now finally starting to address questions of whose needs and what needs and how we define the “good life”.

The fourth level takes these ideas further, and poses the question of the role of business in a society that is actually frugal and has reached satiation in terms of material demands. How could one create value and business in such a society? Are there sources of value that go beyond material consumption (“stuff”)? For example, value that emerges not only from quantity, but from the quality of the experience? Curiously (and perhaps to our advantage from a sustainability standpoint), questions like these are arising from the business community itself as the fourth industrial revolution resulting from automation, robotics and Artificial Intelligence takes hold – and where there are real questions about the role of labor and the future of work. Maybe we will need to find other sources of value so that there can be a return to labor outside of conventional production – and we may then not need as much of conventional production, if there are other means of livelihood for people.

2.4 Implications for a Sustainability Strategy

Finally, it is important to bring this discussion back to the question of a “strategy”. This a critical part of the Global Sustainability Strategy Forum, and that is because what we lack is an effective strategy – the levers (as Archimedes said) that could move the world.

In our case, it is about recognizing where we need to do more, where we need to change course, and

where we need to innovate and attempt something new.

3. Key ideas and insights emerging from the Workshop

3.1 Basic Insights on the Interactions between Business and Academia

There are three termini (intertwined concepts) for the changes that are underway towards sustainability: *transition*, *transformation* and *transgression*. *Transition* implies that the changes are emerging independent of the will and activities of the actors. *Transformation* is based on the concept of actively designing and shaping the future towards sustainability and *transgression* includes a disruptive turnaround from the present to the future. The function of business is particularly necessary in the second concept since business is a powerful and globally effective actor in shaping the future. Regardless of which sector, it is important to reflect on which of the three concepts is more suitable in various pathways towards sustainability.

The common assumption is that societies are operating in a mode of stability, occasionally interrupted by sudden changes. It is, however, more plausible to think of societies that are permanently in the mode of change and transition, striving for some kind of stability. This has major implications:

- There is no “business as usual” scenario, since side conditions will change and require adjustments.
- The quest for stability is the default option that needs to be actively addressed. Academic as well as business communities need to provide responses that include adaptivity and flexibility but, at the same time, provides society with the assurance of creating some stability.
- As much as innovations are part of the necessary flexibility and the required adaptive management approach for improving sustainable practices, they are also causing further problems and deficits. In a constantly changing world it is impossible to assess, let alone avoid, negative side effects of innovations. Society is required to establish and maintain a permanent monitoring and adapting process for governing complex processes and pathways for innovation.

The role of the private sector in attaining sustainable practice can be seen under three different paradigms:

- We sustain the mode of production and consumption and try to minimize costs to the environment and social goals (example: energy efficient car)
- We change the mode of production, include major innovations in providing the goods and services that are demanded but keep the demand more or less as it is expressed today (example electric car, video conferencing instead of travelling)
- We rethink our demand and go back to the roots of the demand: needs and wants. Production and distribution of goods and services are then aligned to what we define as our human

needs and wants (example: change in mobility behavior, less demand for air travel, use of bicycles and public transport)

Which of the three paradigms are being needed for a successful transition towards sustainability may vary from one sector to another, from one region to another and from one culture to the next. Each would need different forms of cooperation between science/engineers, corporate decision makers, regulators, NGOs and society at large.

There are three modes of creating order: hierarchy, competition and cooperation (based on kinship, common values or swarm intelligence). None of these three are by nature superior to each other. But relying on only one has normally been proven problematic or at least risky. The global economy has been moving into the direction of competition and efficiency. However, allowing competition to govern the economy may erode, in its current state, the coherence of communities because it prioritizes a focus on individuals or individual units. To a limited extent, it is useful, but the world economy is overdoing it. We need a good balance between hierarchy (effective regulation), competition (efficient production modes) and cooperation (resulting in fair and sustainable practices).

If we want to have sustainable initiatives or actions at any level we should focus on three criteria that apply to all stakeholders, including academia and the private sector: responsiveness, accountability and ownership. There is no universal formula for combining these three components but all need to be met. Some lessons from past experiences can help to meet the three criteria:

- Cooperation should be guided by the spirit of the SDGs and principles of circular economy. They should consider the implications of other major transformations, such as digitalization and globalization, and reflect the impacts on workers, consumers, minorities, vulnerable groups and marginalized people.
- Avoid engaging in top-down paternalistic transfer of “solutions” and rather co-generate solutions or responses by including all the actors that are affected (procedural fairness)
- Good solutions are tailored to context and not taken from a recipe book
- Respect the social and cultural context in which the cooperation is embedded. There is no one solution for all
- Solutions brokers may be helpful but they often focus on short term solutions rather than long-term, sustainable solutions
- Build coalitions of the willing and engage in partnerships with NGOs and academic institutions in order to start moving ahead, rather than waiting for the optimal solution for all to come
- We should consider a broader idea of corporations, including business, NGOs, government, churches, unions

Regarding sustainability, corporations as well as academic institutions do not form a homogeneous body. Within the business sector there are some entities more sensitive, and others less sensitive to sustainability issues. While certain oil companies are fighting to stretch the hydrocarbon era, despite its heavy environmental consequences, other companies have learned that the future will reward those investing in renewable energies. Similarly, within academia, there are groups more sensitive to sustainability, while some others are not. It is easier to connect academic and business groups already committed to a sustainability agenda than it is to establish dialogs between those with very different views and commitments. On the other hand, it is difficult, but nonetheless possible to establish meaningful dialogues in highly conflicted situations, so this should not be categorically ruled out.

If academic institutions intend to be effective change agents for sustainability, they need to undergo major internal changes:

- The internal reward system of academic institutions (publish or perish) is not functional for the newly required mandate to facilitate the transformation of society into a more sustainable state. This mandate requires a reform of the curriculum for most disciplines, the integration of service to the economy and society into academic career programs, the teaching of new interdisciplinary and transdisciplinary research methods and a better incorporation of ethical values into leadership programs. Furthermore, the present funding mechanisms that emphasize short-term projects leading primarily to academic publications, rather than societal impacts also need major revision.
- Sustainable solutions require inter- and transdisciplinary competence. Most academic institutions are not well prepared to apply such methodological approaches. There is a need for developing a common language between disciplines (based on mutual understanding of each other's concepts and methods) and a process-oriented expertise on how to design and moderate cooperative forms of communication, negotiation and deliberation.
- Academic institutions take for granted that societal actors are driven by (instrumental) means-ends rationality. However, there is a wide variety of rationales based on implicit or explicit values in human and organizational behavior that defies the common assumptions of this type of rationality. When reaching out to other parts of society, academic actors need to acknowledge the variety of rationales and respect them (as long as they do not contradict established findings of scientific inquiry or violate ethical or legal norms)
- Academic knowledge is only one, however crucial, component of a solution space. Moreover, most wicked problems cannot be resolved by "a solution" but require a continuous sequence of responses based on reflection, monitoring, and iteration. Other types of knowledge - experiential, tacit, traditional, are often equally or even more important to define and implement these responses.
- Retaining a strong sense of humility in engaging with other knowledge holders is an important component of success in co-producing knowledge for the common good.

3.2 Insights from the Discussions on Principles of Cooperation between Academia and the Private Sector

Cooperation between the academic and the business sector is crucial for helping economic actors to include the best available knowledge in complex situations and to ensure evidence-informed decision making. One of the main problems with respect to the interaction between business and academia is the difference in time horizons. Academics need long time periods to come up with firm conclusions, businesses need to respond quickly to new challenges and opportunities. There is a need to synchronize, but how can this be accomplished? One idea is to have the decision makers specify what degree of precision and confidence in accuracy of scientific knowledge they need and to provide academic communities with the capacity to do adequately reliable rapid analyses of what is actually requested.

There are key differences between science and business that need to be addressed when building modes of cooperation. Following the discussion on the keynote presentation about the four levels of sustainable practices in business operations (Part 2.3): business is best at the upper two, science better at the lower two. This is in part also a temporal issue: business operates at the faster timescale, with less time for reflection. Science does the reverse. But there is another element: business is solution-oriented, science problem-oriented. And finally: in working together on short-term issues, scientists should invert their logic, focus on issues as defined by business, while looking at the longer

term. Within their business models, business can focus on the trajectories and goals defined by science.

The interaction between academia and business can only be effective if it is based on mutual learning. Such a learning mode has several implications:

- It should start with an honest and sincere assessment of the present situation, the common goals, and the challenges that the participants are facing.
- It should include also the questioning of unsustainable routines and practices (willingness to unlearn or to forget practices that do not fit the purpose).
- It should be based on mutual trust that each actor is willing to contribute to the common goal.
- Trust is relational and thus identifying implicit values (e.g. in narratives) may facilitate trust building
- Learning includes efforts to agree on factual evidence, common values and goals, and the respect for each other interests and preferences regardless of agreement.
- The methods of learning should be based on the principles of deliberative discourse.
- The results should be evaluated and monitored by external reviewers.

A first critical condition for an effective interaction between business, academia and society is the transparency and openness. The collaboration should be based on openness about basic epistemologies, theories and methods, and should include the limitations and failures of different disciplines and approaches in academia as well as in business. All arrangements should be made public and the data (that are not proprietary) should be shared among all actors. Transparency is a major driver for change since the fate of private corporations also depends on public reputation and image.

A second major condition for a successful cooperation between business and academia is a clear understanding of each other's role and function. The partners from academia can provide substantive evidence on all topics relevant to sustainable practices, but also good advice for designing processes for decision and policy making. They can also monitor such processes as to whether they are complete, comprehensive, accurate and fair. The business communities can offer platforms for testing new approaches (such as living labs), provide data for further analysis and to exchange experiences about what works and what does not and why. Furthermore, all cooperative arrangements need to answer the question of who is affected – positively or negatively - by the changes that are envisioned.

A third major condition for a successful cooperation between academia and business is the inclusion of incentives beyond monetary gains or losses. Academic input is needed for designing criteria and test methods for certification (such as forest stewardship and others), for developing standards for regulators and for designing product and service specification within the value chain. Many of these standards and specifications, including ISO norms, provide very effective methods for bringing even reluctant businesses into compliance with sustainable objectives.

3.3 Models for Cooperation

Models of cooperation need to be based on mutual, long-term learning, flexible and adaptive processes and joint ownership of ideas generated. The normal 2-3-year cooperation project is not the best model for reaching this objective. A continuous agreement requires sufficient funding, mutual trust among all the actors involved and reliable commitment by all parties.

A good starting point for cooperation is to develop an inventory on what private actors and initiatives have already done or accomplished: There are many experimental designs for cooperation that have been tested and applied in various countries, domains or sectors. Particularly interesting are models of cooperatives that are based on common good concepts and that strive for efficient and fair solutions to meet sustainability challenges.

Many academic and research institutions, including academies of science, as well as universities, can take the role of boundary organizations that provide continuous service to the business communities by inserting new research results, providing new ideas or challenges, and facilitating contacts with other stakeholders such as users. Likewise, the business communities can bring in real life experiences with what works and what does not work, data from practice and a review of problem solving methods.

Another interesting model is the establishment of extension services that are typical for many universities in the USA when dealing with agricultural stakeholders. They are well established, serve practical needs and are also respected by providers and users of the academic knowledge. This idea of extension programs could also be broadened to include the manufacturing, energy, digital and other domains of businesses, as well as sustainability.

A means to facilitate cooperation in a long-term perspective is to invite representatives of academic institutions to serve on advisory boards or Boards of Trustees of academic institutions and vice versa.

Key to a successful cooperation is also the adequately designed education in academic institutions: Almost all business leaders have completed a university degree. So, engaging students in academic courses and related projects that provide guidance for responsible, accountable and future-oriented leaders is one of the main tasks of university education and/or specialized institutions of secondary learning or training. In addition, universities and educational institutions can and should offer courses for professionals from the private sector to bring them up-to-date on sustainability issues and improve the knowledge and skills they need for addressing the sustainability challenges that they face.

3.4 Lessons from the Covid-19 Crisis

The present Corona infection underscores the need for investing more in resilience. The world economy is governed predominantly by the goal of efficiency. For an economy to be sustainable, we need to allocate more resources into a new concept of resilience (but resilience alone will not suffice to guarantee sustainability). This new concept of resilience includes the need for being more robust than before the crisis. It is based on redundancy, diversity and continuous adaptation. For making resilience a much stronger concept in governing the economy, governments need to set the right incentives for the economic actors, since society as a whole will benefit from enhanced resilience.

The Covid-19 crisis also revealed that almost all countries shared a priority of values starting with saving lives, maintaining critical infrastructures and building on mutual care and solidarity (at least within the communities in which people live). Economic values such as efficient production and increase in consumption were set aside in order to serve the social needs of those who struggle with the disease. This might be an opportunity to reflect about the priority of values once the crisis is over. Economy should serve society and not the other way around. This redirection of value priorities is not opposed to business or economic activities, but could rather serve as a starting point for designing special services and meeting social and cultural needs with products and services for which people will be willing to spend money.

In addition to resilience, social justice and fairness are key values that need to be served when transforming today's economies into sustainable ones. This implies an equal share of resources to all those who need these resources to cope with natural, physical, economic and social risks. This has become quite obvious in the recent Covid-19 crisis that demonstrated many violations of social justice and fairness in providing health care for all. Business should contribute towards offering capacity building in all countries and regions in which basic needs cannot be met due to poverty, lack of infrastructure or poor governance. This is primarily the role of governments, yet large (and especially large multinational) corporations could play a more active role in strengthening capacity building. In the long run, this will also help them to recruit qualified personnel and to develop a stable and predictable market.

The present Covid-19 crisis brings to the fore the need for better regulation. Here, academia might have some contribution to offer to regulators as well as to business corporations. Business is by definition a profit-oriented activity. The main driver is the market. If a market is not fully convinced, there is always advertisement as a tool to gain more market share. In the academic world it is different. There are solid mechanisms to regulate research, such as peer-reviewing, research protocols, codes of ethics and deontologies. Science has a lot to learn from the "market" rules, considering markets as an institution based on an open process between suppliers and users of products and services. At the same time, business has a lot to learn from academic self-regulating practices. Ontological principles, such as Responsibility (Hans Jonas) and Precautionary Risk Management are equally applicable to both sectors. And business knows how to market goods and services: why not use that competence to incentivize sustainable lifestyles and practices.

In 2008 governments helped banks, whose political lobbies were clamoring for "less State". Now, facing the Coronavirus pandemic, there is a claim for a new Marshall Plan and other governmental aids. But the role of the State is not confined to providing ad hoc remedies for crisis. It must rather rely on a "sustainable" institutional capacity. The present crisis is also an opportunity to use sustainability criteria for supporting economic actors and rebuilding a sustainable, circular economy. Providing funds for recovery should be linked with meeting special sustainability criteria such as a carbon-neutral production mode. In particular, the SDGs could serve as guidelines for the new economic recovery programs. Tackling global challenges demands responsibility, strong institutions and effective regulatory frameworks. This means that the ideological proposition of a "Minimal State" does not correspond to the needs of governing a modern risk society (Ulrich Beck). The State is situated outside and above the civil society as well as the private sector. It is thus the regulating body that is destined to set the rules (Hegel). Thus, it may also demand that the resurrection of the economy is governed by criteria derived from the SDGs.

Being forced to live at home and work in home office may also be taken as an experimental test for changing lifestyles. Less consumption, less traffic, more reliance on virtual communication, more time with family and relatives may also lead to a re-adjustment of what is regarded as "normal". Routines change slowly if ever, but if the crisis prevails for a longer time, individual preferences as well as lifestyles that have evolved through the crisis, may prevail after the crisis. If the private sector, NGOs and governments use the time after the crisis to incentivize sustainable forms of living, then this could be also an opportunity for some necessary changes that are required for coping with climate change and other environmental challenges.

As long as countries lacking infrastructure and weak governance systems are not helped in eradicating the virus, there will be a major risk for re-infection in those countries that have overcome the first round of the epidemic. Taking global responsibility is not only a moral requirement, it is also essential for one's own benefit. This solidarity based on egoistic, as well as altruistic motives, is needed at least until herd immunity is accomplished with development and application to the majority of the population of an effective vaccine.

4. Annex: Answers to the questions sent by the participants prior to the workshop

4.1 Question 1: How can academic research in sustainability science converge effectively with corporate sustainability strategies to design feasible, effective, and fair transformation pathways harmonizing both corporate and societal needs? What are recent examples of such collaboration and what can we learn from them?

(Coleen Vogel)

The greatest challenge the Anthropocene poses is not how the Department of Defense should plan for resource wars, put sea walls up, buying a Prius. The greatest challenge we face is a philosophical one: understanding that this civilization is already dead. The sooner we confront our situation, the sooner we can get down to the difficult task of adapting, with mortal humility, to our new reality (Judith Butler cited in What climate collapse asks of us, written by Bayo Akomolafe – The Emergence Network). This quote sums up what in my view is needed – Deep adaptation efforts, not only surface and incremental, but thinking and action that is deeply rooted in how we see ourselves, others and our common humanity in this complex world.

I have recently been engaging with business (large corporates and CEOs) and while the climate and future scenario modeling and a science gets to them it is when we talk about the ‘deep adaptation’ needs that their ears prick up and we are asked back into the board rooms – the humble, ‘mortal humility’ dialogue that includes that there is NO silver bullet and we have to get through this together.

(Marcel Bursztyn)

Research in sustainability science is, by definition, a solution-oriented activity. This means that, unlike some strictly scientific research fields it has a natural vocation to interact with non-academic actors. But this is not enough to build pathways to collaboration. Partnerships are only viable when all parts involved feel that working together is advantageous. Advantages, in this case, are not necessarily material or financial. They can be related to other aspects, such as mutual learning, complementary skills and means, or commitments with common goals. As in any coupling, parts must be flexible.

Some types of demands addressed to researchers tend to expect results in the short run, while research usually operates under longer timespans. Actually, the academic system as a whole is

grounded on time-consuming processes and rituals. It may take years to reach results and then at least one more year between submitting a paper and its publication!

Non-academic players can't wait so much time. Flexibility, in this case, means finding ways to conciliate rigor in scientific research and the immediate demands of the "real world". Adopting other criteria to reward or acknowledge the contribution of researches (other than just publish or perish) could help answering this question.

On the other hand, non-academic actors must be flexible enough to admit that some responses to complex demands sometimes can't be produced within the duration of a political mandate or a fiscal year.

Innovation and Technology Development Center at Polytechnic University of Madrid (Spain) - itdUPM is an interdisciplinary academic unit where I've had the opportunity to see, from very close, a very interesting initiative joining academia, the private sector and a governmental development agency, in order to cooperate in a humanitarian action in an Eritrean refugees camp, in Ethiopia. See:

<http://www.itd.upm.es/alianzashire/who-we-are/?lang=en>

https://www.youtube.com/watch?v=DWzUHZr9JT0&list=PLazAYOVsmcxADFA-Dlp_p4vxVUs33bbyY&index=3

In this case, the partnership is focused on humanitarian action, but the model of collaboration is applicable to other types of win-win actions.

(Marie-Valentine Florin)

At a workshop organised by IRGC at IASS in October 2018 about [systemic risks](#), with goal to discuss how academic research and corporate (including government) work could better align, the majority of representatives from private and public sectors emphasized that academic work was far too conceptual for them to use it effectively. Proof of concept was often missing, attention to what makes business sense (e.g. economic constraints) was often poor, as well as attempts to understand the need from practitioners. This left us a bit troubled!

Obviously, there are important differences between the science of systemic risk and the science of sustainability, but there are also similarities in the sense that:

- both fields are marked by complexity, uncertainty and ambiguity. While corporations can cope relatively well with complexity, few of them are comfortable dealing with scientific (esp. normative) uncertainty and ambiguity. In short, balance sheet and stock market are not friends with uncertainty and ambiguity.
- adaptive governance has been found to be useful, both for dealing with systemic risks and for developing environmental sustainability, but corporation do not like flexibility in regulation (unless they can have an influence on the adaptability of a regulation). Planning the extent to which a regulation can be flexible and adaptive (as in [Planned Adaptive Regulation](#)) might be the way to go, but there are important obstacles (cf IRGC work on [Planned adaptive Regulation](#), currently under revision).
- Transformation pathways require transitions, and there are many expected and unintended negative consequences of undergoing transitions, which academics can describe, but often result in high operational and investment costs and other obstacles that corporation find difficult to cover or overcome.

- The misalignment between short and long time scales are also challenges for corporations. Misalignment of time horizon is well described by academics. Cost of transformations occurs in the short term, but benefits will be reaped only in the longer term. Social scientists, in particular economists, understand the problem but the solutions that they can propose (e.g. economic instruments, societal deliberations) are challenging most managers (and rarely fit well with expectation from stock markets)
- Long-term views are needed, but foresight (esp. exploratory scenarios) is often seen as expensive and top management may fear that the outcome could threaten their authority.
- Corporate sustainability strategies (often under the heading of CSR) can be discredited if corporations use them for their own marketing (window-dressing).
- Respective roles of science & research and business & consulting (with consulting defined as translating research in recommendations that make sense to business): Research and science can provide data, information and knowledge. Business needs recommendations for action. Such recommendations can come as much for other's action as from science, but science can help learn from experience. Leverage experience gained elsewhere in innovation 'niches'. Use learning from experience, including from catastrophes (e.g slow-moving catastrophes can help make sense of the slowly unfolding (but predictable) Covid-19 catastrophe. Recommendations for business action can only be provided when the goal has been determined (or for the purpose of defining the goal is that goal is not yet defined).

(Sander van der Leeuw)

This convergence has, first of all, to deal with different time horizons. Over the short term, it implies an inversion of the research procedure, moving from questions raised by corporations to using science to find solutions. But over the long term it implies the opposite: moving from long-term predictions based on science to long-term solutions reorienting corporate strategies. In the first case, an emphasis will be on organization science, business, engineering, law, economics, design, etc to provide the short-term solutions corporations need. But in the second case, the emphasis will be on the sciences that can design long-term strategies (30-50 years) for corporations to enable them to meet long-term socially and environmentally sustainable goals.

The convergence also has to deal with spatial scales, both long- and short-term, by reducing spatial footprints from global to local or at most regional and thus eliminate the huge cost of transportation. Because of great differences in environments, this will include finding different diets, and use of different materials for many things, but also different approaches to governance, shifting responsibilities to subsidiary scales. Here, the ICT revolution can play an important role if a degree of value convergence at appropriate scales can be found.

(Bruno Sarda)

Corporate sustainability leaders need good data to make decisions and need solutions to recommend to their organizations. Academic research with a focus on what needs to change and how it needs to change can help corporations in their change management processes. A good recent example is the Science Based Targets Initiative (SBTI). This initiative helps corporations set climate goals that are in line with climate science – helping them determine at what rate they need to decarbonize their businesses to be in line with the ambition of the Paris Climate Accord – without having to do or even understand the science. Over 800 large companies whose collective emissions represent hundreds of millions of tons of GHG annually have now set or committed to set a science-based target. On the heels of this great success, there is now work to create a science-based targets network (SBTN) to help guide businesses to address other environmental dimensions (ie- biodiversity, deforestation, water) in line with scientific guidance but again without having to do

the hard science themselves.

(Martwi Diah Setiawati)

- Integrating the “sustainable development” outlook into corporate sustainability & CSR
- Creating corporate sustainability research relevant (i.e., academics could seek direction for research questions from practitioners based to their immediate needs and pressures before conducting the research)
- Increasing collaboration and accessibility (e.g., academics may join practitioner organizations and networks and attend practitioner conferences, practitioners should be encouraged to attend academic conferences to begin to interact with the academic community, academics need to adjust with corporate incentive structures)
- Transdisciplinary research approach
- Developing a common vocabulary for transdisciplinary sustainability related research
- The realization of embedding sustainability in business schools
- Examples: ICSS Conference, Development of Carbon Dioxide-Based Plastic (collaboration between Mitsubishi corporation consortium industrial and Academia)

(André Luiz Campos de Andrade)

I would frame my answer in two tranches: one more empirical oriented and the second one assuming a more abstract idea.

In regard to the first approach, I would say that there are many research agendas with a high potential to bring sustainability science and the corporate together, such as further research about: i) social life cycle of products; ii) corporate sustainability reports (including issues like taxonomy, indicators, etc) and iii) the use of the fourth industrial revolution in the promotion of more sustainable pathways.

The second part of my answer has to do with a more philosophical aspect about what consumption represents in our society. “What you buy indicates who you are or who you want to be”. It isn’t necessary to detail in our Forum what such type of thinking represents in terms of ecological footprint, natural resource depletion, etc, in a society that year after year is reaching highest levels of income and life expectancy. Neither to say that if such thinking won’t change corporate sustainability strategies, most of the SDG will fail. So, my point is: As Scientists, and together with the corporate world, we will also need to put a strong emphasis in the discussion of consumer’s behaviour when we are talking about corporate sustainability strategies. In terms of examples of collaboration about what I just said, one nice example would be the work of the WBCSD called “[sustainable lifestyles programme](#)” which is dedicated to the behavioural aspects of the consumption. The WEF has also a dedicate project about [the future of consumption](#), that might be worth to check.

To sum up, I would say that there are plenty of ways where we see hints of convergences between academic research in sustainability sciences and corporate sustainability strategies and it is almost undoubtable that we could improve such convergence. To do so, I would say that we should frame our research approaches in two “fronts”: Technological and behavioural insights.

(Christina Schoenleber)

The sustainability challenges we face are highly complex encompassing societal, economic and technical elements. Addressing these will require international stakeholder groups made up of academic experts drawing on cross and multidisciplinary knowledge as well as relevant industry

and arguably also intergovernmental experts to provide input as well as buy in to address these.

The ability to work collaboratively on such challenges and achieve effective results with impact will require;

- to have a trusted relationship between key stakeholders who are able and willing to collaborate on a long term basis
- for parties to agree to a set of common goals that are mutually beneficial and agreed by all stakeholders.
- to have a neutral project convener and
- to establish from the outset a plan how to implement, disseminate, scale up and/ or monitor findings and solutions to achieve the desired long term impact.

A good example for successful multi stakeholder partnership convened by APRU is the project series on AI set up in 2017 titled [AI for Everyone](#), [Transformation of Work in the Asia Pacific](#) and [AI for Social Good](#).

(Nicole de Paula)

Operationalization of a concept is the hardest part of my research on Planetary Health. It is essential to highlight that Planetary Health will only become truly relevant when it can prove its value and effectiveness on the ground and for businesses. There's a need to develop protocols that assist health professionals at the local level to translate "planetary health" into public policies and business opportunities. This is the main challenge that this community faces, in my opinion. Experts keep saying that we need to improve participatory tools for transdisciplinarity. In my view, this includes the private sectors too but academics do not seem to take these debates forward.

I want to share an example from 'One Health', which "recognizes that the health of humans, animals and ecosystems are interconnected. It involves applying a coordinated, collaborative, multi-disciplinary and cross-sectoral approach to address potential or existing risks that originate at the animal-human-ecosystems interface." To illustrate how the present crisis related to the pandemic is not so new, the EU has been engaged in prevention by, for example, funding a project named ComAcross, which had \$4 million euros to promote One Health in Southeast Asia, which tried to differentiate itself from previous works by choosing participatory tools through the theoretical lenses of socio-ecological systems health, when dealing with infectious diseases preventions in 2014. This means building capacity-building from a bottom-up approach. The most successful part of the project was the one that managed to build bridges between local communities and decision makers in Laos. The business, however, were absent in this discussion. We can also learn from failures, which usually relates to the absence of change when the project and funding end.

(Alicia Montoya)

A key question for sustainability science to solve is externalities. How can we better account for the full picture / true cost? Only then will humans take on the economic reality and start making the right choices.

Also, the question of doubt: The way science communicates and advances is by questioning and only asserting once hypotheses can be confirmed. Unfortunately the enemies of sustainability use this to their advantage, questioning the science of it. This is more a communication problem but one that is having detrimental effects to us advancing as it cuts R&D efforts.

(Joyeeta Gupta)

For me academic independence is a must; Academics do not work for profit; corporate bodies do. Recent research into impact investing shows that corporate bodies are aiming to create impact in limited arenas while their environmental footprint increases in other arenas. I think academics have to think about (a) an alternative model for sustainable living; and (b) standards within which business must function - such standards needs to be institutionalized within legal systems. Collaboration should be intellectual and neither financed by business or dependent on business. I am opposed to the current trend that we must always find business partners.

(Peter Schlosser)

The key is to find corporate partners who are open to change and who either are committed to sustainability or pressured into it by their customers and then develop a relationship of trust. On this foundation, common interests and goals can be identified and be addressed jointly. An example is TSC (The Sustainability Consortium: <https://www.sustainabilityconsortium.org/>)

(Anand Patwardhan)

One can think about this at two levels. To what extent is academic research helping advance the reconceptualization of business and the "social contract" under which it operates? Are we helping actors realize that the "market" and the "invisible hand" are ultimately social and human constructs - and as such, are relative rather than absolute (in which category I would put the laws of physics and chemistry). At the next level, the issue is not so much about the linkage between *sustainability* research and *sustainability* strategies. The question is whether sustainability strategies become mainstream to corporate thinking and behavior - and this will require an engagement of academic sustainability scientists with mainstream academic communities working in management and business fields - just as it requires sustainability to be a topic of boardroom conversations, rather than something left to the sustainability office. I wonder, therefore, if we have actually framed this question right.

I believe that sustainability standards (think Fair Trade) and reporting are a good example of ways by which sustainability becomes more *mainstream*. Much has been done in making environmental management relate to the *bottom-line* of firms - bringing out the linkages between cost and efficiency / productivity, for example. Sustainability standards like fair trade helped make the connection also to the *top-line*, by bringing out opportunities for product differentiation and competitive advantage.

4.2 Question 2: What are common priorities on which both the scientific and business communities should focus in a 5-10 year period, as well as in a longer-term perspective?

(Coleen Vogel)

Building on from the above, we need acknowledgement that we are all in this mess and need to work together; that we need science-based and other knowledge based, credible evidence and philosophical inputs - where we can think and listen and learn together; that no one knowledge domain has the answers; that it is not all doom and gloom but can be filled with opportunity etc. We there-

fore need to be providing the safe spaces to engage and we also need to be supporting a science that engages (that is transdisciplinary and movements that includes the philosophers, artists, creatives etc., those working in the decarbonization space etc). Debates (hard ones) about divesting from coal; alternative jobs and skilling; who will lose jobs in mining coal and what lifestyle change will be required – all need to be discussed in a frank, honest way and with ‘mortal humility’.

(Marcel Bursztyn)

Sustainability (not just as an abstraction or a weberian ideal type) is a strong common goal. Scientific and business communities (and also politicians) agree on the need for durable processes (of life systems, of political stability, of prosperity).

More specifically, some major global challenges depend on the common action of different sectors and should be addressed jointly: vulnerability and adaptation to climate change, in order to cope with disruptive processes; population ageing; emerging diseases; migration and refugees; energy transition; “green” technologies, food security.

(Marie-Valentine Florin)

At IRGC, we are trying to help academic, governmental and business communities work together on matters related to risk governance. Using a broad definition of risk and risk governance as a process, we don’t suggest any normative goal to 'good risk governance' but our concepts and instruments have been developed for the purpose of supporting organisations in their task to determine what goal they should pursue. With this comes the suggestion that:

- One of the priorities for how the 3 communities can align their work is to assign a goal to sustainability. Sustainability (per se) cannot be 'the' goal that a business will pursue. The primary goal of a private company owned by its shareholders is to reward the investment made by its stakeholders. If sustainability is needed to reach this goal, it will be there, if shareholder's value can increase without the company to be environmentally sustainable, sustainability as a goal will probably not be among the company's objectives. Sustainability is most often a constraint. For sustainability to be enhanced, business community must determine what goal can only be attained if it is sustainable. This is an area where the scientific and business community could work together: aligning environmental and business goals.
- Another priority for joint work by research and business is to develop criteria for sustainable technologies (and/or their applications). We need to understand the consequences for environmental sustainability of some new technologies that are developed (in academia) and implemented (in business), and develop mitigation options. For example, blockchain and cloud computing (energy consumption) or advanced materials (nano-based systems produced by the convergence of nano, bio, neuro, or digital technologies) may cause long-term threats to ecosystems, which are not yet on the radar of technology developers, business and regulators. Some of these technologies are developed precisely to remedy problems caused by other technologies, but there is little attention to their own sustainability. Criteria are needed for what is sustainable technology development.
- Revisit ways to address the tension between innovation and precaution. An indirect but perhaps useful way of addressing the need for academic research in sustainability science to converge with corporate sustainability strategies is to look how the academic and legal concept of 'precaution' (which is very present in work about sustainability) can be reconciled or can align with the business need for innovation. More precisely, organisations like the OECD (and IRGC) are interested in addressing the 'tension' between innovation and caution.

- Understand whether resilience can work for transformation. Resilience is often viewed as a necessary strategy to cope with large and uncertain disruptions from unexpected shocks in systems, such as environmental systems, and a condition of sustainability. The first property of resilient systems (and goal of resilience building strategies) is to rebound from shocks, to recover from disruptions, and resume operations so that the system can deliver the systems it is expected to provide. As the state of the system may have changed, resilience must enable that system to adapt to new context conditions. Both academics and business acknowledge that complex adaptive systems must be resilient. However, it is not obvious that a resilient system built to rebound, recover and adapt is effective to steer a system towards transformation (i.e. more than adaptation). Transformation requires other kinds of dynamisms, and ability to innovate or take risks. There is an academic literature about transformational resilience, but businesses may still see resilience as reactive strategy to cope with the risk of disruption, rather than proactively support a system's transformation.
- Address the tensions between climate change (or sustainability) and democracy. If democracy does not allow the emergence of a majority of individuals in favour of sustainability, what are the other ways of achieving sustainability? Is more authority or a better leadership needed? Is this only possible with authoritarian regimes? [Should sustainability be mandated?](#)
- Leverage the sense of urgency, as shown by Extinction Rebellion (for example). Partly in reply to the deficiencies in the policies towards climate sustainability, movements like Extinction Rebellion are challenging current institutions (whether public and private) and blaming them for not listening to or acting in response to climate science. An interesting area of work for the scientific and business community (together) might be to learn from this movement how to develop and gain from the sense of urgency.

(Sander van der Leeuw)

The main principles have been outlined in the last answer. But if we move into the most important domains where these principles have to be applied, we can distinguish between the material ones (ensuring water, energy, food and health security in ways that are compatible with environmental sustainability), and the societal ones (rebalancing wealth between nations and individuals, attaining new sets of values that are compatible with these goals, rebuilding multi-level communities and identifying governance principles that are appropriate for these, etc.) The main challenge here will be ensuring that the ICT revolution develops in directions that favour these goals, rather than adding to the current chaos due to the rubbing out of the distinction between signals and noise at the societal level.

(Bruno Sarda)

There needs to be more focus on how to achieve and manage effective transitions. How will corporations and communities get from where they are to where they need to get to. What steps will need to be taken. What investments will be required. Business decisions need to be informed and guided by science, but not be held hostage to rigid or abstract models that don't lend themselves to decision making.

As to the priorities, they should align on what will it take to maintain healthy and thriving societies where commerce and production remain viable at scale, and should help focus business actions and decisions in line with what society needs (eg Sustainable Development Goals, Planetary Boundaries etc).

(Martiwi Diah Setiawati)

- Leadership
- Challenge on knowledge transfer between research and business
- Adapting to the changes (i.e., demographic change, take advantage of the technology, Trends of millennials, etc.)
- Long term collaboration perspectives

(André Luiz Campos de Andrade)

In the medium term, what is also the lifetime of the SDGs, I believe that both communities must focus on the governance matters that evolve the different issues to unlock a sustainable pathway. Being a policymaker with previous experience in environmental policies, I would say that another big challenge of this decade is the need of building bridges between academia/business societies with the policymaking world. It isn't enough to say that we must have a policy making process based on the best available science. We will need to find/create spaces (governance frameworks) in order to politically enable and mainstream the potential outcomes of the joint efforts developed by business and scientific sectors.

Moreover, in a long run perspective there are three unescapable issues that science and corporations must prioritise: i) solutions to face consequences, threats and opportunities of a (already) warming world; ii) the consequence of the fourth industrial revolution in the nature of work, research and business and; iii) the rapidly urbanization of our society (specially in Asia) in a time of massive change.

(Christina Schoenleber)

The Agenda 2030 provides basis and focus for the next 10 years and beyond for a wider set of industry stakeholders.

Climate Change is a key priority area for the short, medium to long term requiring buy in and input from key international players.

(Nicole de Paula)

One central thing we need to ask ourselves is: why is there so much resistance to frame human health in the context of our environment, especially considering that: I) this is an old issue II) there's heavy scientific evidence demonstrating the dangerous impacts of environmental change. Climate change is the most powerful example that science alone does not drive change. What is different in the Anthropocene is the urgency to perceive health in a more holistic way and dependent on natural environments. We need to be change-makers and identify areas where we can have the greatest impact. What I am learning is that promoting gender equality is one of the most cost-effective ways to promote planetary health. Planetary Health won't become a reality, if inequalities are not addressed. In a Yale study, female public opinion consistently perceives environmental issues, such as climate change and biodiversity loss, as more urgent and worrying than their male counterparts. This means that we are losing out from the leadership of women in various boardrooms. If this changes, we can ultimately enhance innovation and the effectiveness of sustainable policies. That is why I decided to build a new coalition that highlights the importance of gender just solution for a healthy planet. Women Leaders for Planetary Health was created at the last UN Climate Summit in Madrid in 2019 and it is now officially launched. We are still analysing the best way to move forward. But the focus is on actions in the global South because it is there that we can have the biggest impacts.

(Alicia Montoya)

In terms of priorities, I would say ensuring we protect critical ocean and land breeding sites and ecosystems is a fast way to stop the plummeting of ecosystems we are witnessing, and buy us time to solve the longer term issues. And for corporates, mandatory reporting.

(Joyeeta Gupta)

I think it is critical that the current model of business be revisited, what are the alternative ways of doing business. The Corona virus shows that the corporate sector has nothing saved for a rainy day, they are all asking government for bail outs. The profit motivation is a motivation that takes the resilience out of the system. It also demonstrates the importance of having strong social institutions and governments able to lead.

(Peter Schlosser)

An obvious and overarching issue is the optimization of material cycles including minimizing extraction of raw materials, increase of use cycles, efficient recycling, and minimizing waste disposal back into the environment. A specific example is carbon management with impact on climate and novel fuel cycles. E.g., Silicon Kingdom Holding: <https://www.linkedin.com/company/silicon-kingdom-holdings/about/>

(Anand Patwardhan)

I am assuming that we are trying to identify the common priorities that the two communities need to address collaboratively and jointly? In that case, building on my response to question 1, I think we need to connect sustainability much more centrally to the ongoing discussions about the future of business itself – whether it has to do with growing income inequality and concentration of wealth, or having to do with the changing nature of work, driven by technological change. This goes back to our conversations at the first GSSF forum where we started to explore the interlinkages between the major transformations underway – globalization and digitalization.

4.3 Question 3: In local to regional scales, what institutional frameworks and structures would best support sustainability scientists and business leaders working together to facilitate the necessary transformations?

(Coleen Vogel)

Dialogues and honest engagement spaces. We should ask the business community and trade unions and co-design this. They are now very ready to engage much more than this time last year!

(Marcel Bursztyn)

Task forces (gathering researchers, decision makers and representatives of the civil society), focused on problem-oriented activities. As an ad hoc team, a task force doesn't need to be formally institutionalized. As "projects", they may last only during the time necessary to provide a response

to the demand to which it was created.

(Marie-Valentine Florin)

Institutions such as the UN GRI / Global Compact or the World Business Council on Sustainable Development (WBCSD) have tried and are still effective platforms to enhance dialogue and to recommend solution pathways.

However, institutional frameworks and structures may not be the best places to support and facilitate transformations. Institutions are often characterised by inertia. Incumbents oppose change that may threaten them. So looking for think tanks and innovators outside of the institutional world is also necessary (e.g. Extinction Rebellion). The work of the European Environmental Agency ([EEA](#)) on [Sustainability Transitions](#) is interesting in this respect.

(Bruno Sarda)

Businesses will need advisory boards to help guide them through change; there needs to be standards and protocols for measuring and reporting progress; sustainability scientists needs to find their voice in the media and at sustainability events where business and financial leaders convene, and where academics/scientists often don't.

(Sander van der Leeuw)

Create intensive local and regional collaborations between scientists and business leaders to develop local and regional solutions to be implemented in order to improve global sustainability conditions. This will require important changes in both the business and science institutions, removing all kinds of barriers and in general facilitating cross-fertilization and intellectual fusion between approaches, focusing on both global and local/regional needs.

(Martiw Diah Setiawati)

Stakeholder participation, social inclusion and equitable development, promotes socio-cultural knowledge, sustains the natural environment, Evidence based, knowledge management, economic benefit, integrated and transdisciplinary, Future scenarios

(André Luiz Campos de Andrade)

There are plenty of structures that might support the joint efforts of scientist and business leaders amongst which I would highlight the [World Economic Forum](#), [Business for Social Responsibility](#) and the [World Business Council for Sustainable Development](#). In terms of Latin America, I would say that the [Economic Commission for Latin America and the Caribbean](#) is doing a god job in terms of steering the SDG action within the countries which comprise the region. In Brazil, the [Centro Empresarial Brasileiro para o Desenvolvimento Sustentável \(CBEDS\)](#) is a non-profit organization conformed by Brazilian companies which promotes sustainability.

(Christina Schoenleber)

Most of the issues that need to be addressed are global challenges that will require a collective effort on local, national and regional levels.

The United Nations Sustainable Development Goals and the Agenda 2030 provide an overarching

global framework looking for economies to contribute at national and local levels.

It provides a fitting framework that enables stakeholders and actors to design interventions, collaborations and solutions based on local, national needs and capabilities. The UN itself provides the platform to assess the collective impact of such intervention on a global scale.

(Nicole de Paula)

Our common goal is to combat reductionism to include a complex and integrative framework of health. How to do this is controversial. Disciplinary competition still exists and I don't think we have found a solution for that yet. The same is true for business facing the cooperation paradox, which means that companies have very few incentives to cooperate over one goal, if they perceive that they will lose comparative advantages in the market. What I do know is that to promote change, we need to break the silos. That is, to see and recognize our own blindness to the negative consequences of our fragmented knowledge. This is also a problem for companies. Are our current political and social systems ready for this?

Health in the Anthropocene has become the most relevant opportunity to, finally, bridge the gaps between natural and social sciences, as well as to include multiple stakeholders. As an internationalist, I'm interested in the best ways to bridge bridges between science and policy making. For that we need to address the complex notion of time and find ways to include the future generations into our present decision making. So this is a conversation that engages many institutions but they remain blind to it. Public services, schools, universities, business alliances, local authorities are examples where these conversations could positively evolve.

(Alicia Montoya)

As for institutional frameworks and structures... Tough one. I would like to see all companies and governments working towards the SDGs, measuring progress against agreed industry-relevant translations of the goals. Swiss Re is working with SASB on definitions for insurance. Are all industries involved in similar efforts and how do we agree on the KPIs? Should the UN SDG team be the link?

(Joyeeta Gupta)

I think we need a return to strong and accountable government; we need better tax justice and clear rules of the game. We need both separation of power to ensure the rule of law and we need different actors accountable for different things. Collaboration is fine but it needs to be based on the different roles of each institutions.

(Peter Schlosser)

The framework has to be a program that values problem solving, co-creation and stakeholder exchange platforms. Such a program has to value impact and has to use appropriate (new) metrics for success in academia.

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Funded by the ministries of research of the Federal Republic of Germany and the State of Brandenburg, the Institute for Advanced Sustainability Studies (IASS) aims to identify and promote development pathways for a global transformation towards a sustainable society. The IASS employs a transdisciplinary approach that encourages dialogue to understand sustainability issues and generate potential solutions in cooperation with partners from academia, civil society, policymaking, and the business sector. A strong network of national and international partners supports the work of the institute. Its central research topics include the energy transition, emerging technologies, climate change, air quality, systemic risks, governance and participation, and cultures of transformation.

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