Research and Innovation Futures after Brexit
Scenarios

soif School of International Futures

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Section 1: Introduction and Scenarios

The Context

The UK voted to leave the European Union (EU) on 23 June 2016. Prime Minister Theresa May triggered Article 50 on 29 March 2017, and the UK now has until March 2019 to negotiate terms for its exit or to agree an extension to the negotiation deadline.

In the absence of any agreement – a "no deal" scenario – the relationship between the EU and the UK will default to World Trade Organisation terms, with uncertain implications for UK and EU citizens, trade, customs and regulations.

The UK and EU have both publicly stated that Research and Innovation will remain an important priority – agreeing that the UK and EU have a lot to offer each other. However, the outcome for Research and Innovation remains unclear.

There are many details that still need to be resolved including mobility and collaboration, regulation and policy, and funding. For instance, will EU and UK workers have easy movement in the future, what rights will they have? Will UK researchers still have access to European framework programmes and funding?

Given this uncertainty, it is practical to explore and plan for alternative futures: to think not only about our preferred future, or "Plan A", but to consider how we might prepare for less positive futures.

What might Plan A look like?

There is broad consensus across the research community that a positive outcome would include the smoothest possible transition to the closest possible association with EU research programmes. Researchers would be able to move between the UK and the EU in support of their work and there would be a permissive regulatory environment that

enables research and innovation to flourish. Ideally, we would remain closely associated to EU research programmes.

What if Plan A doesn't happen?

The scenarios presented are part of a project that School of International Futures is running for the Royal Society. The aim of the project is simple: to help the Research and Innovation sector look beyond 2019 and plan for a better future.

They build on research, conversations and a workshop held at the Royal Society in August 2017 which brought together stakeholders from across the research and innovation community, including early career researchers and university, government, charity, industry and think-tank representatives.

The scenarios describe four alternative possible futures, looking out one decade to help shift perspectives away from immediate concerns. They assume that Brexit has happened and the UK is not closely associated to EU research programmes.

Critically, the scenarios are not meant to be predictive. In fact, one thing we can be sure of, is that none of these scenarios will come to pass. However, by taking the time to explore alternative futures you can start to make strategic choices. For instance, by developing and prioritising policies that are resilient in multiple futures, or those that are particularly effective in a particular future.
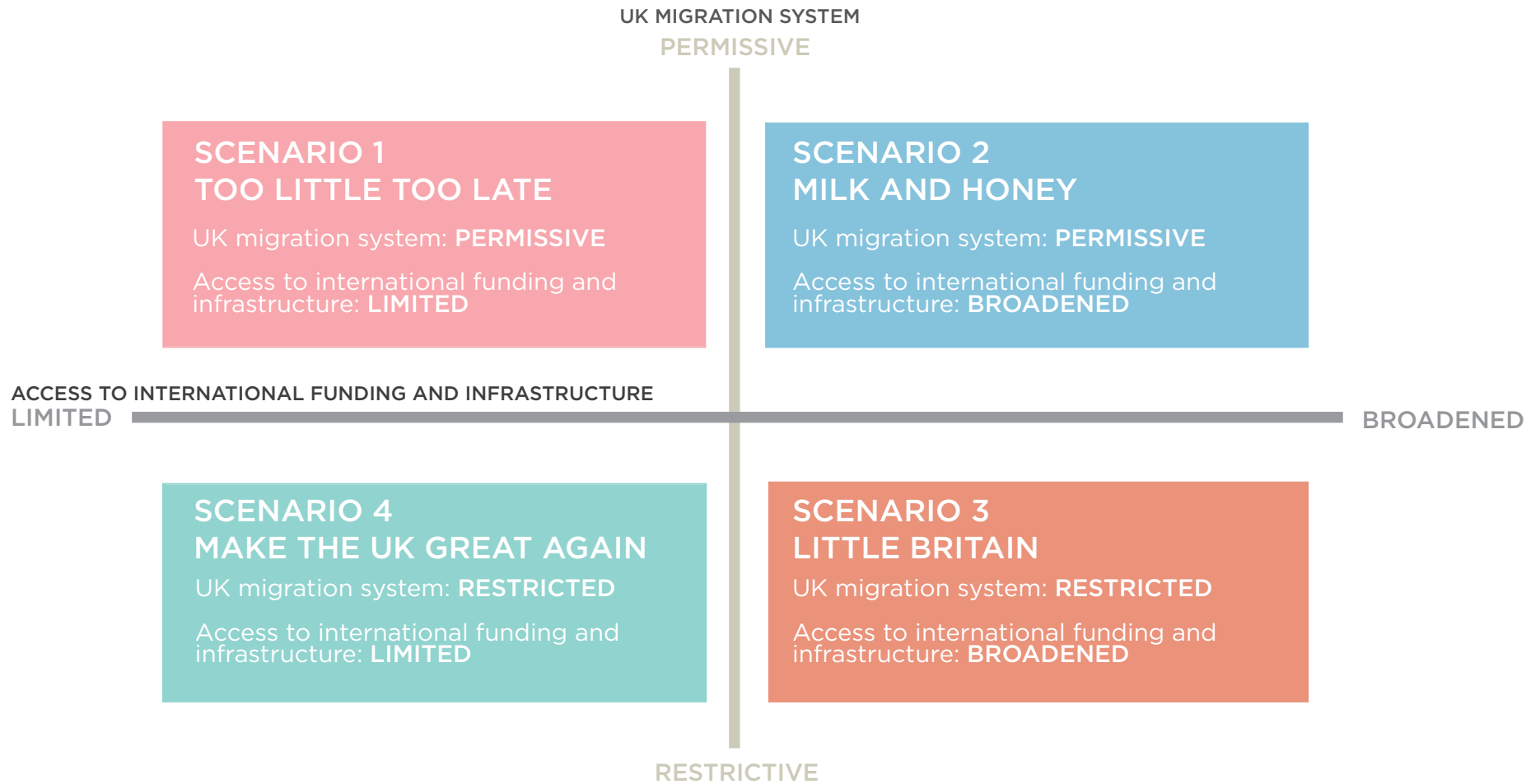
We hope you'll read the scenarios with an open mind and use them to challenge your organisation to think about and prepare for alternative outcomes.

In Section 2 (page 13) we've included some questions and a set of tools to aid you in this process, but please get in touch if you would like to find out more.

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Four Scenarios for 2027

UK MIGRATION SYSTEM
PERMISSIVE

SCENARIO 1
TOO LITTLE TOO LATE

UK migration system: **PERMISSIVE**

Access to international funding and infrastructure: **LIMITED**

SCENARIO 2
MILK AND HONEY

UK migration system: **PERMISSIVE**

Access to international funding and infrastructure: **BROADENED**

ACCESS TO INTERNATIONAL FUNDING AND INFRASTRUCTURE
LIMITED   BROADENED

SCENARIO 4
MAKE THE UK GREAT AGAIN

UK migration system: **RESTRICTED**

Access to international funding and infrastructure: **LIMITED**

SCENARIO 3
LITTLE BRITAIN

UK migration system: **RESTRICTED**

Access to international funding and infrastructure: **BROADENED**

RESTRICTIVE

The scenarios were developed using a two-axes methodology. Each axis represents a key uncertainty that could affect the UK's research and innovation position in 2027. Different outcomes of each axis are used to generate four scenarios from a range of possible futures.

- **UK migration system**: will migration be restrictive or permissive with corresponding impacts on skills, talent and collaboration?
- **Access to international funding and infrastructure**: will the UK have limited access to EU and international funding and infrastructure, or will it have successfully broadened its relationships globally to start to improve access.

Scenario 1:
Too Little! Too Late?

The UK spent almost a decade believing that a comprehensive trade deal was just around the corner, but it never came. In 2024, Brexit negotiations held in Tirana, Albania (the latest country to join the EU) stalled and the UK exited the EU without a trade deal. In 2027, the UK government is struggling to make up lost ground.

Tough times

The economy is suffering. Locked out of the customs union and EU platforms and infrastructure, restricted access to physical resources and goods has become one of the UK's most significant issues. New tariffs and regional restrictions on exports have disrupted supply chains. High inflation means the population is suffering and the use of food banks is on the rise. From finance to technology, companies depending on a high-skilled workforce have left the UK for Continental Europe, Asia, the Americas and Africa.

Universities missing out

Since 2019, UK universities have faced increased international competition for students and international applications are falling. EU funding has gone, hitting the social sciences especially hard. Shifting exchange rates and high inflation are making it difficult to manage budgets for the (now relatively few) grants received in overseas currencies. There is ambition for change, but funding remains radically limited.

A decade after Brexit - pursuing a global UK

The government is pushing hard to develop industry partnerships and funding instruments. Bilateral and multilateral agreements with trusted partners around the globe are a priority. 'Global UK' is the new marketing campaign, aimed at establishing collaboration and attracting investment. The UK has introduced fiscal

and domestic incentives to target industry sectors at risk of leaving. Heated debate in parliament focuses on whether we should weaken workers' rights in order to boost international investment.

Government intervention

Two key manifesto pledges ahead of the 2020 General Election were bringing crucial change to migration and to the climate for universities. In 2022, the UK ratified a simplified and improved international visa regime. Short-stay and long-term visas for skilled workers have been fast-tracked in exchange for increased monitoring. Meanwhile, the Higher Education Rescue Bill is offering a 'University Bailout' scheme, pushed through under the auspices of the Office for Fair Access. Extra funding is made available for those institutions that boost their industry and international collaborations and attract early-career researchers from India, China and elsewhere in Asia. The government takes the decision to increase its debt in order to fund these and other strategic interventions.

Scenario 2:
Milk and Honey

Following a period of transition, in 2022 the UK struck a successful free-trade agreement with the EU as a Third Country. A contribution to the EU brings us the movement of goods, people, services and capital. Today, in 2027, new bilateral arrangements with non-EU partners are in place.

UK dependent on EU and losing influence

The UK has lost influence in Europe. In return for access, the government has agreed to remain subject to the majority of EU legislation. The UK has to work hard to get their interests represented on the European stage. UK interests are often represented through other EU member states, which is only possible when they align with one another.

Companies and organisations who hoped for new freedoms find instead that they are subject to ongoing restraints. In areas areas where the UK has chosen to diverge from EU regulation and standards, disparities mean that data and goods cannot always be shared with ease.

Bridging the innovation gap

Science, research and innovation has become a UK priority. The government recognizes that 'blue skies' research is vital, and funding flows accordingly. The UK continues to host select EU research infrastructure. The UK benefits from Third Country access to the EU's broad funding mix and also find ourselves with new global research partnerships across Asia, the Middle East and the Americas. The launch of the new pan-pacific Neural Observatory is just one example of our new intellectual axis.

Industry champions?

It is now easier for UK workers to move overseas and for skilled international workers to move to the UK. Financial and services sectors also benefit from the flow of people and ideas. Industry begins to take on a wider share of global investment in Research and Development. Promising research is seized on by companies looking to benefit. Grand challenges and innovation prizes drive research agendas. The UK invests in industry and training, boosting the economy by championing new skills in an increasingly automated, data-driven landscape.

Universities rise to the competition

Universities have been quick to take advantage of the new technology visas. EU students continue to be eligible for home fee status and free tuition loans, and EU workers keep their preferential access to the UK labour market. International talent floods in at all levels, helping universities to align effectively with the government's new priorities.

Scenario 3:
Little Britain

The UK soon saw that a withdrawal agreement with the EU was unlikely. They embraced a future outside the EU under WTO rules. Fast-tracked trade deals with new international partners came with lowered tariffs to preferred countries and in the early 2020s both the UK and Europe experienced renewed protectionism.

Tough choices and long-term solutions

The UK has faced political pressures to tighten migration. There is no free movement with the EU and the global visa system is increasingly complicated. The UK has lost research infrastructure to other EU countries, and it is clear now that it will take too long and cost too much to replicate.

Overseas workers do not see the UK as an attractive destination, especially in light of the extremely limited provision for their families and dependents. The UK faces significant skills and labour shortages. The government is torn between protecting borders against the next humanitarian and environmental crisis and opening them to attract new talent.

A glimmer of hope

Regional innovation and devolved administration of domestic funds have allowed new avenues for innovation and collaboration. UK universities are encouraged to build regional networks and partnerships and to foster innovation through links with communities and businesses.

Rapid advances in connectivity and data sciences are fuelling the ability of individuals and communities in all regions to engage with research and innovation. Real-time feedback and idea generation have joined crowdsourcing and participative approaches to funding to boost flexibility in innovation.

Skills shortage still bites

Many international businesses have maintained their UK presence. Skills shortages have in part been addressed through improvements in training, especially for mid-career workers. However, some companies have had to focus their operations due to a lack of specialist skills.

New research agreements with countries in Asia and with the US and Canada sit alongside bilateral agreements with individual EU member states. Universities continue to grow their physical presence overseas while also enhancing their virtual identities to enable collaboration with international research communities.

Scenario 4:
Make the UK Great Again

As the first country to secede from the EU in 2019, the UK struck a limited free-trade agreement. The UK in 2027 sees closed borders and customs checks with a reduction in net migration.

New restrictions on goods, people and data

EU-UK trade is hit hard as the free-trade agreement ends and tariffs rise. The movement of people, goods and data is restricted. Customs delays impact supply chains. UK companies feel that they are discriminated against. Although the UK has focused on establishing new trade agreements internationally, success has been limited and agreements can only be made with countries that have no preferential deal with the EU.

Government funding for research has minimal impact

Universities and research institutes compete for a smaller pool of skilled workers. Subjects relying on EU funding have seen cuts. Some UK researchers have been excluded from EU projects. Invitations to join consortia and attend conferences are on the decline and options for collaboration are limited. Significant numbers of researchers are leaving the UK to seek opportunities abroad and join new research infrastructures, especially in the EU and Asia.

New regulation to encourage collaboration

To encourage collaboration, the UK continues to focus on world-class regulation in emerging technologies. Many companies still develop their Intellectual Property in the UK although often with the aim of

then exporting to larger markets. On the whole, the UK research and innovation community still sees itself as part of Europe and participates as a Third Country in EU research programmes. With planning underway for FP10, UK researchers in all sectors call for a renewed focus on excellence.

The government has focused funding to reinforce existing research. Universities have forged new alliances with each other and with local industry. Skills shortages have led to increased demand for life-long learning, with universities offering new programmes and new modes of study.

Fall in migration and house prices reduce pressure on local services

A reduction in net migration has caused a fall in house prices, together with some lessening of pressure on social services. Even in an economy that is struggling overall, there are early indicators that social inequality may be starting to reduce.

Section 2: Preparing for an uncertain future

We can be certain that the future we experience will be different to any scenario we can imagine, and we do not expect any of the four scenarios to happen as described. The future may contain aspects of any or all scenarios, as well as others that we cannot yet imagine.

However, just because we cannot predict the future does not mean we should not do all we can to plan carefully for it. Scenarios are one means to do this, by considering and planning for alternative outcomes.

To help, we have included a few questions and tools that you may like to use to explore the scenarios from different perspectives and to think through what they mean for you, your organisation and the sector.

We encourage you to use these with others, and ideally with those who can bring external and diverse perspectives, and challenge your own views.

Questions to ask:

- What can be done to ensure a positive outcome for research and innovation in each scenario?

- What does a competitive future for research and innovation look like?

- How is the world in 2027 different from today?

- How has the research and innovation system changed?

- Who are the big winners and losers in each scenario?

Additionaly, work with your team to:

1. Explore the scenarios from different perspectives (Personas)

2. Brainstorm implications (Futures wheel)

3. Test your strategy (Windtunneling)

4. Understand how a future may come about (Back-casting)

1. Explore the scenarios from different perspectives (Personas)

Use personas to explore the scenarios from different perspectives.

1.   Use one of the personas provided or write your own.

2.   Start by considering the different personas in your scenario.

3.   What are their needs? How is life different? What is their life like? What new or interesting needs might they have?

University Professor

Took a subject-leader position at a secondary school after completing a PhD in crop science. Continued her research on urban farming through affiliations with a university and local community research and built up a diverse network, allowing her to rejoin academia after seven years. British, 39 years old, married with one child.

Head of University Department

Data specialist. Started in a research group and gained increasing responsibility for the whole department's data over time. Completed a 12 month data policy placement in UK government, now head of department leading a shift towards open data and collaboration. British, 52 years old, married with no children.

Industry Innovator

Educated in medical science in the UK he has worked for large pharmaceutical companies in research and development. He now works in a senior position for a UK company with interests in Africa, requiring frequent travel. Well known for having developed both innovative products and new business methods. British, 52 years old and married with one child.

International Researcher

Has a PhD in trade and economics. He has built a successful research career in China, engaging in wide-ranging international collaborations. He is seeking a move to a research post in the UK. French, 42 years old, married with one child at university in China.

Curator / Entrepreneur

Completed a PhD in an industrial research setting, and continued to work in industry for her early career. Moved from Austria to the UK to take up a post as a science museum curator developing new visual tools to engage the public. Swiss, 32 years old, unmarried.

Citizen Scientist

Educated as a geologist and works as a primary school teacher in Estonia. She spends her summers working on research projects across Europe. Has close links to a European-based conservation charity but collaborates with three UK universities. Estonian, 48 years old, married with two children of school age.

Skilled Researcher

Has an MSc in electrical engineering. Joined a large science and technology consultancy after several years working with UK tech start ups with international operations. Now part of the senior leadership and a frequent traveller. British, 58 years old, remarried with two children from a previous marriage.

Early stage researcher

Has a PhD in archaeology. Works in a University research group in the UK and volunteers for a local charity. She is very interested in working abroad in the future to broaden her career prospects. Australian, 29 years old and unmarried.

Foreign Student

Having completed a masters in science in Argentina she is currently looking for an industry-sponsored or academic placement in the UK. Having developed strong networks through her interdisciplinary studies she is looking to balance work and research in her next role. Argentinian, 23 years old, single.

2. Brainstorm implications (futures wheel)

Use the Futures Wheel[1] as a brainstorming tool to explore the direct and indirect consequences of a scenario.

1. Start with a particular scenario. Consider what has changed between the present and the future described by the scenario. Pick one key issue/change and write it down in the centre of the wheel.

2. Work in a group to think through what the impacts or implications of that change might be (first-order impacts). Write these down in the next layer of the wheel.

3. Once you have finished that layer, repeat for a second or third layer.

4. Take a step back. What are the most important or provocative impacts or implications that you have identified? What can you do to help mitigate or encourage them?
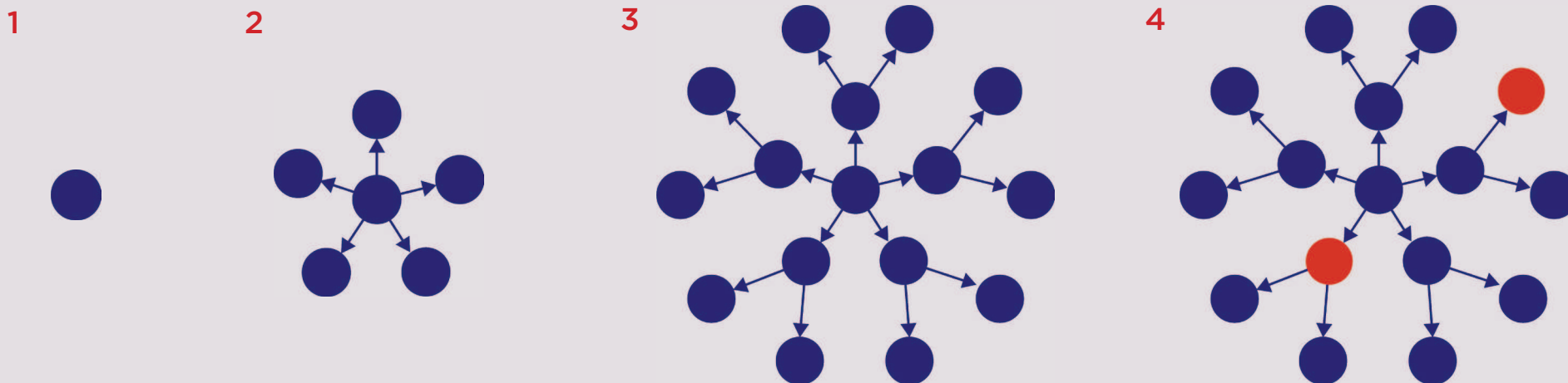
1   2   3   4

3. Test your strategy (Windtunneling)

Understand what strategies are most effective to mitigate or respond to a scenario

1. Start by identifying the policies or strategies that you would like to test. This may be an existing strategy or alternatively, work with one scenario to generate new ideas that would help you deliver your work in the scenario.

2. Work in small teams to test each idea systematically in the scenarios. Fill out a windtunnelling template. Do the strategies work in the other scenarios? Do they need modification?

3. Implement strategies that are robust across all scenarios "no regrets"? And get ready to implement those that are particularly important if a particular scenario were to emerge?

	VISION	SCENARIO 1	SCENARIO 2	SCENARIO 3	SCENARIO 4
POLICY 1	✅	⚙️	❌	❌	✅
POLICY 2	⚙️	⚙️	✅	⚙️	✅
POLICY 3	✅	✅	✅	✅	✅
POLICY 4	❌	❌	⚙️	✅	❌

✅ WORKS
⚙️ NEEDS MODIFICATION
❌ DOES NOT WORK

Example Windtunnelling template

For more information on wind-tunelling visit:
http://bit.ly/foresightguidance (page 17)

4. Understand how a future may come about (Backcasting)

Start by imagining your scenario has come about. Work backwards from that future to the present in small steps to find out the conditions and changes that lead to it. Those conditions and changes are things that can be influenced once identified.

1. Draw a timeline. Start in the future and imagine yourself in the scenario.

2. Step back one step and consider what would need to happen for that scenario to have come about? You may have multiple ideas, write these down, focus on one (you can come back to the others later)

3. Next, step back another step. Again, think about what would have happened for the event/change you identified in Step 2 to have occurred? Keep stepping back to the present.

4. Once you arrive in the present, play it forward? Does it still make sense? Adjust your timeframes if needed.

5. Repeat for as many backcasts as you can. There is more than one route to any future.

6. What routes, events or paths feel the most challenging, surprising? Which ones seem most likely? What can you do to encourage (or discourage) a particular pathway? Plan, monitor and prepare for different pathways.

Time
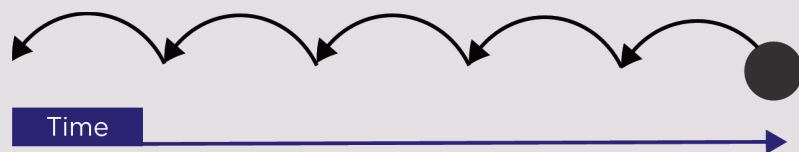
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