Thank you for your letter of 7 March, regarding quantum technologies. Please accept my apologies for the delay in responding. In your letter you asked a series of further questions relating to the government's response to the committee's report. I have provided further information to address each of your questions below.

In relation to recommendation 2: Your response indicated that the Executive Board will be expected to review the innovation ecosystem to determine what more is needed, and that Innovate UK will engage with industry shortly to discuss "industry appetite for innovation centres".

UKRI and BEIS have engaged closely with industry to determine the requirements of the National Quantum Technologies Programme (NQTP) through a series of workshops and the Industrial Strategy Future Sectors review of quantum technologies. There have also been numerous discussions with companies as part of the process of obtaining letters of support for Wave 3 of the Industrial Strategy Challenge Fund (ISCF).

Our findings from these conversations are that we need to better understand how more innovation centres add value over and above existing provision, yet maintain the flexibility to invest in compelling business cases. Therefore, we will ensure that we have delivery strands within NQTP which are capable of funding buildings and facilities if these are required to support innovation.

We would support this via two strands of the programme: CR&D Projects arising from competitions; and Technology Projects arising from negotiations with individual companies. Innovation centres could also be funded in the future, if necessary, by bespoke programmes using UKRI funding, similar to the National Quantum Computing Centre.
In answer to your specific questions:

- **When you expect decisions on potential innovation centres?** Decisions will be made on a case by case basis as part of the award of grants within the NQTP. Competitions and calls are likely to start in the late summer or autumn.

- **Whether these decisions will be made by the Executive Board?** Decisions on funding will be made by either Chair of the Executive Board or the Challenge Director, dependent on the size of investment and the programme delegated signing authority limits.

- **If the Executive Board determines that Innovation Centres are important for development of the UK quantum technologies sector, what resources would be available for their establishment?** The resources will be provided by the grant or funding recipient as part of normal funding in the NQTP.

In relation to recommendation 4: We recommend that UK Research and Innovation should take into account ‘in kind’ contributions from industry as it looks to industry to play an equitable role in supporting quantum technologies. Your response indicated that “to be in a position to do so UKRI would need to be assured that these were compliant with state aid rules, quantifiable and with businesses making in-kind contributions being able to demonstrate a genuine and sustainable commitment to a project”.

- **Confirm that UKRI will review the potential for accepting in kind contributions in order to ascertain such assurance, and that it will seek to accept such contributions as far as is possible.**

As the committee heard in oral evidence, there are areas where UKRI’s councils do recognise in-kind contributions from industry. For instance, in EPSRC research projects, a collaborating organisation may declare an in-kind contribution such as staff time or use of facilities. UKRI hugely values such contributions as they provide significant benefit to the researcher and funder alike. However, such contributions are not a condition of funding and the level of assurance required for in-kind contributions to these projects reflects this.

The rules and nature of Innovate UK’s projects are slightly different. Innovate UK’s projects focus on translating research toward more commercially viable products, to the benefit of the firm or firms involved in the project. Innovate UK grants a proportion of the project costs, with the partners declaring their costs as a condition of that funding. The level of assurance required is significantly higher for the Innovate-UK projects. This is necessary to ensure that firms are meeting their commitments and that the regime is compliant with state aid rules.

In the NQTP, UKRI has a portfolio approach, using both mechanisms. This means UKRI has a degree of choice in how it funds projects. Harmonising the EPSRC and Innovate-UK approaches, which differ for very practical as well as legal reasons, is likely to restrict that flexibility.

- **Set out what funding the government expects to be available for fundamental research in quantum technologies as the National Quantum Technologies Programme develops.**
The total investment in quantum technologies research for the next five-year period, as set out at the time of the 2018 Budget, is £315m. The streams which address fundamental research include:

- The four Quantum Hubs - £80m
- National Quantum Computing Centre - £77m
- EPSRC quantum programme (skills and training) - £25m
- EPSRC quantum programme (research) - £60m

These four elements support, to a greater or lesser degree, fundamental research. These figures remain subject to the outcome of the spending review.

UKRI will also continue to support research and postgraduate training in quantum science through its cross-cutting schemes and EPSRC core funding.

In relation to recommendation 9: Your response noted the recent EPSRC competition for Centres for Doctoral Training (CDTs) in quantum technologies, as well as other mechanisms offering doctoral training in this area, as examples of training programmes to be delivered in the next phase of the National Quantum Technologies Programme.

- State what proportion of the £315m awarded to the next phase of the Programme will be allocated to training.

Through UKRI, EPSRC is committing to continue its investment in postgraduate training in quantum technologies as £25M across the next five years; this is 8% of the total committed value. The maintains the level of investment in research training and skills from the first phase.

The current portfolio of investment includes continuing to support the Phase 1 investments until they come to an end:

- Three quantum technology Centres for Doctoral Training which end in September 2022.
- Three quantum technology Skills and Training Hubs which end in March 2021, which fund doctoral students, and early career fellowships focussed on entrepreneurship training.

This also includes funding for the two new CDTs which will be supported until 2028:

- EPSRC Centre for Doctoral Training in Delivering Quantum Technologies.
- EPSRC Centre for Doctoral Training in Quantum Engineering.

Doctoral training may also be supported by other routes outside of the NQTP, such as EPSRC doctoral training partnership and ICASE awards, university funded doctoral students or industry funded doctoral training.
• Specify the number of doctoral studentships for research into quantum technologies that you now expect to be supported at CDTs, and across all available mechanisms.

Across all doctoral training investment routes EPSRC estimates that 250 quantum technology doctoral students were supported in phase 1 and EPSRC anticipates it will support a similar figure in phase 2.

• Set out what steps have been put in place to improve the ability of industrial partners to engage with CDTs after their new funding period has started.

In 2019/20 EPSRC will be working with its partners in the NQTP to develop a strategy for investment in research skills and training for quantum technologies. This will impact how EPSRC invests in training and skills for quantum technologies across the next five years with a view to meeting the needs of the NQTP.

EPSRC encourages industry and other-user engagement in all of its doctoral training. The two recently announced quantum technologies CDTs include 66 project partners who are providing both cash and in-kind contributions to the CDTs. It is anticipated that this will continue to grow further during the lifetime of the centres which will run until 2028.

In relation to recommendation 14: Your response state that the Government was organising a workshop to discuss the need for training and guidance on the threat to national security that could arise from collaboration between UK universities or businesses and researchers affiliated with foreign militaries, and related matters. Please could you provide more detail on:

• When this workshop will take place?
• What outputs are expected from the workshop?
• The extent to which these will be made public?
• What you expect the follow-up actions from the workshops to be?

Government and UKRI are hosting a workshop on 24 May with academics, businesses and government officials to:

• Raise awareness among the quantum technology community of existing and changing regulations that influence the development and commercialisation of quantum technologies, and signpost to the community where to seek advice.
• Consider mechanisms to understand and monitor potential threats to national security from hostile state activity.
• Provide a forum for agreeing guidance and sharing information between industry majors, SMEs and academia about best practice in collaboration and international trade.
• Understand any concerns regarding the implementation of new regulation to ensure that they do not represent a barrier to growth.

The workshop will enable the Government to address several areas with the quantum community around safeguarding and threat monitoring, as well as assess what further guidance will be required following our findings. It will also give consideration to the appropriate
communication channels for us to share such information. It is anticipated that the majority of the outputs from the workshop will be made public for this reason and disseminated to the wider community.

This work is co-ordinated with wider activities within the NQTP that sets expectations of the quantum community to work within the national security infrastructure to monitor and mitigate potential threats.

If it would be useful, I would be very happy to arrange a meeting for you with senior officials to discuss these matters in greater detail.

I hope this is helpful.

yours ever,

CHRIS SKIDMORE MP