First of all I would like to thank the committee for the trust invested in me by inviting me to give evidence on this highly future relevant topic. I would like to take the opportunity to emphasize a couple of points which either have been made by the expert community during the hearing on the 3rd or which could not be elaborated on due to time constraints but which I personally find nevertheless essential:

• The NHS colleagues mentioned that they are lacking essential skills to develop, test, validate and pilot innovative technologies, which does not come as a surprise as the core tasks of the NHS is certainly not technology research and development. In this context, it became clear that Scottish universities such as Strathclyde and Napier and also Scottish SMEs have essential skills that are missing in the NHS skill-mix. Unfortunately, there seems to exist no vehicle alongside NHS Procurement to share NHS R&D funds.

• NHS Procurement is not well positioned to make decisions with regards to the purchase of innovative technology as they typically lack the capacity and skills to assess and judge cutting edge technologies and their potential impact across the board.

• NHS management typically lacks the capacity and the skills to assess and judge cutting edge technologies and their potential impact across the board. This frequently leads to expensive outsourcing, questionable outcomes and poor efficiency.

• The typical NHS care model with face to face care at any time is like most care models globally unsustainable due to changing demographics. There are 3 main developments happening right now which all require the rapid uptake of enhanced and advanced mobile communication technologies such as LPWA and 5G: 1. The shift of the point of care towards the patient – from hospital to outpatient, 2. The emergence of smart pharmaceuticals which require real time connectivity and are associated with industry 4.0 (Health 4.0) where the real world is connected with the virtual world (example: connected asthma / COPD inhalers that prevent exacerbation), 3. Virtualisation of Care – delivering care online in an automated fashion using algorithms and allowing to work with 3D animations, gaming, etc. Scotland needs modern digital infrastructures to operate world class health care
over the next 10 years to come.

- 5G technology. England has already invested £20 million in 5G technology in centres at Kings College, University of Surrey and Bristol to prepare for 5G field trials and has committed to up to £1 billion of funding to implement this technologies in areas such as automotive, healthcare, etc.


The amount of investment in Scotland is zero despite Strathclyde and Napier being heavily involved in this topic on an international level. Future health technology cannot be tested in a country that is lacking these essential technologies. If the Scottish government does not invest in these technologies it will have a devastating impact on several industries, including health technology, pharmaceutical, biomedical, etc. This has so far not been appropriately considered by the Scottish Government.

- Testing and validation in the NHS is time consuming and requires sufficient resources. It is unlikely that testing and piloting in NHS environments under the current pressures (shortage of staff, shortage of funds, shortage of space, shortage of IT resources) will lead to reasonable outcomes. Piloting and testing needs to be in line with standards, which need to be met in order to make the results useable. This is not always the case, especially where sample sizes are too small or island solutions with insufficient interoperability are piloted. NHS entities, which provide testing grounds and are involved in product development need protected resources to conduct this work properly.

Sincerely Yours

[Signature]

Professor Christoph Thuemmler