

## Response to the Business Productivity Review July 2018

The National Physical Laboratory (NPL) is a world-leading National Measurement Institute and is responsible for measurement strategy and delivery in the UK. NPL is owned and funded (in part) by BEIS. NPL sits at the heart of the UK's National Measurement System (NMS) and works in partnership with government, academia, applied research labs and industry to deliver the greatest benefit for the UK and the world.

We conduct high-quality measurement science and provide products and services that enable businesses and public organisations to make reliable measurements and have confidence in the decisions they make based on them. We support businesses to innovate, improve productivity and grow and enable public organisations to protect and improve the quality of life of the public.

Below we set out NPL's responses to the questions that we consider most relevant to its area of expertise.

### Technology and innovation adoption and diffusion

*12. Is there further evidence to demonstrate the link between technology or innovation adoption and a business' productivity growth?*

#### **The use of robust measurement enables productivity improvements**

Productivity improvement is the central driver of both firm and wider economic growth. Productivity is affected by both advances in innovation and **manufacturing efficiency improvements**.<sup>1</sup>

Measurement is key to increased productivity. Robust measurements at the right time and in the right place enables organisations to reduce waste, increase machine utilisation, reduce human intervention and shorten manufacturing lead times, leading to improved productivity and confidence in decision makings.

In a review of measurement case studies, almost 40% cited increased productivity as a result of positive measurement interventions.<sup>2</sup> Manufacturing efficiency supports productivity by helping companies get it right first time and creating efficient supply chains.

During the manufacturing process, fast on-machine measurement systems improve efficiency through reducing the time it takes to detect defective materials or faults in the set-up of the production line, which reduces the scrap rate (or yield loss) and increases quality.<sup>3</sup>

The Laboratories of the National Measurement System (National Physical Laboratory, National Engineering Laboratory and LGC) ensure a robust system of measurement is available across the UK.

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<sup>1</sup>. BIS, "Innovation and research strategy for Growth," *BIS Economic paper*, no. 15 (2011).

<sup>2</sup>. NIST, *Outputs and outcomes of NIST laboratory research* (2003).

<sup>3</sup>. BIS, *The Economics of Metrology and Measurement* (London: BIS, 2009), url:

<http://www.rohs.gov.uk/assets/nmo/docs/nms/prof-swann-report-econ-measurement-revisited-oct-09.pdf>

[Accessed 29 July 2017]

Studies show that companies that make use of the NMS laboratories and good measurement practice gain considerable benefits compared to firms that do not:

- Analysis from a customer survey shows measurement is used across the product life cycle by both customers and non-customers.<sup>4</sup> However, NMS customers are more likely to use measurement to test the final product meets quality standards and to test bought products to ensure that suppliers meet quality standards. In fact, 95% of NPL's customers check for errors in their final product, opposed to only 70% of non-customers.<sup>5</sup>
- An econometric study comparing the performance of firms that use the services of the NMS laboratories showed that support from NMS customers can boost employment by 10%-15% within 2 to 4 years compared to non-customers.<sup>6</sup>

**There is significant scope to extend the benefits to firms that are not currently using good measurement practice.**

### *13. What are the main reasons for businesses adopting or not adopting new to firm technologies?*

In our experience the barriers to adopting good measurement practice include:

- Low awareness of the benefits of good measurement practice and, in particular, low awareness of that the benefits out-weigh the costs of investing in the equipment, skills and staff time required to adopt and embed good measurement practice.
- Uncertainty in the benefits solution and lack of confidence in making changes and investments to processes
- Lack of skills in measurement

### *15. Do you have any examples, from the UK or internationally, of public or private sector approaches that have increased the adoption of best practice technologies or new to firm technologies?*

NPL has a significant track record of delivering programmes to support SMEs, increasing measurement capability across UK businesses. NPL has specific products tailored to lower productivity SMEs including **Product Verification Services** and **training**.

#### **Product Verification Service**

The Product Verification Service is a consultancy based team that specialise in increasing productivity in companies. This helps businesses increase productivity and efficiency, and reduce waste through better measurement technologies and processes. Product verification is a critical part of the manufacturing process, essential in catching manufacturing errors, and providing complete assurance that components and products are made according to the original design specification; reducing product failure, poor performance, waste and customer dissatisfaction.

#### **Training**

NPL sets the standards for metrology training in the UK, helping customers gain maximum value from their measurement systems. We offer training at various different levels to address the needs

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<sup>4</sup> Used during at least one stage of production by 95% of NMS customers who produce goods and 75% of non NMS customers who produce goods.

<sup>5</sup> Databuild, "National Measurement System: Customer Needs and Impact Survey," *Commercial Report for NPL* (2015)

<sup>6</sup> Frontier Economics, "The Impact of Public Support for Innovation on Firm Outcomes," *BIS Research Paper* 20, (2016).

of low productivity firms through to highly innovative businesses, and in a range of formats (face-to-face, e-learning, etc.) to support flexible learning. Our training encourages learners to make a difference within their workplaces, giving them the opportunity to generate a return on investment for their employers while simultaneously improving corporate measurement capability. 92% of organisations see improvements in their workforce following attendance on our measurement training courses and 79% of organisations agree that measurement support enables them to make improvements more effectively.<sup>7,8</sup>

NPL has led and chaired the metrology trailblazer group, working with a wide range of employers and key stakeholders, to develop a metrology apprenticeship. Launched in 2017 the apprenticeship, available to any company, is a certified course delivered via the EEF. The new metrology apprenticeship standards set out the knowledge, skills and behaviours required by Metrology Technicians working across a wide range of industries. The apprenticeship will be promoted widely to increase the range of companies adopting good measurement practice and develop a pipeline of talent needed to fill measurement skills gaps across a range of sectors, developing the next generation of skilled measurement specialists.

#### *16. What actions by the public or private sector would be most effective in driving effective adoption of new to firm technologies?*

Firstly, it is important for firms to be aware of what advice is on offer and then for that advice to be readily accessible and independent. For low productivity firms access can be eased by locality.

Analysing the location of the NPL's customers we demonstrated the effect of distance on the uptake of NPL's services.<sup>9</sup> As this holds for our existing customers we are confident that it also holds, and likely to an even greater extent, for lower productivity firms that do not (yet) engage with us.

Over the last five years, working with regional actors, we identified the need for specific measurement capability in the North of England, a SME-dense area which supports the aerospace, automotive and medical sectors. NPL, in partnership with University of Huddersfield, invested in local capability that now serves hundreds of local companies through a range of products including training, consultancy and specialist services. Our impartial and independent advice is highly valued by this customer base to provide them with confidence in innovation adoption, improved productivity and to increase trading opportunities. We have had similar experience from other regional locations.

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<sup>7</sup>. Databuild, "National Measurement System: Customer Needs and Impact Survey," *Commercial Report for NPL* (2012)

<sup>8</sup>. Databuild, "National Measurement System: Customer Needs and Impact Survey," *Commercial Report for NPL* (2015)

<sup>9</sup> NPL – Effect of Distance on Uptake of NPL's services - partial gravity model, (2017)