### A4 Analysis for Innovators



## Johnstons of Elgin develops unprecedented textile quality controls

World-renowned Scottish fabric manufacturer Johnstons of Elgin worked with the National Physical Laboratory (NPL) on an Analysis for Innovators (A4I) project that embedded technical innovation into the heart of its craftsmanship and created unprecedented quality standards for the finish of cashmere.

### Challenge

Johnstons of Elgin is a 220-year old Scottish company renowned internationally as a high-end fabric manufacturer, bringing a wealth of tradition and expertise to the production of luxury woolen and cashmere fabrics.

The Elgin Mill was established on the banks of the River Lossie in Moray, Scotland by Alexander Johnston in 1797 and the still family-owned business now employs more than 1,000 people between its headquarters and a site in Hawick in the Scottish borders.

As both a supplier to luxury fashion labels and a retail brand within its own right, it needed to bring a new level of quality assurance to the finish of its woven cashmere fabrics. In particular, it wanted to improve the control processes it was using to raise woven fabrics. Raising a fabric is a technique used to increase the 'fluffiness' of a cloth by working wire brushes over the surface.

While traditional individual craftsmanship, based on years of tacit expertise, has determined the finish of fabrics, Johnstons of Elgin wanted to bring enhanced quality control and uniformity to its products.



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The business manufactures cloth 24-hours a day, across three separate shifts for six days of the week, which often means individuals with varying expertise levels are making subtly different quality judgements. This can lead to small variations in the finish of products, even those produced on the same day.

This, coupled with yarns becoming ever finer and designs more intricate, was leading Johnstons of Elgin to witness fabric reworking levels of between 8% and 9% of all output and wastage at between 2% to 3%.

As such, the business wanted to improve its 'right first time' output and reduce the amount of waste that was being sent to landfill. Improved quality control would improve efficiency and make its processes more sustainable.

In addition, a central aim of the project was to retain the craftsmanship and heritage, which is at the heart of its business, but modernise its approach.

#### **Solution**

Johnstons of Elgin partnered with NPL for its A4I project and also brought in the expertise of Chimaeze Onyeiwu, who had been working with the business through a Knowledge Transfer Partnership with the University of Strathclyde.

The project sought to transform centuries of artisan expertise, passed down through the generations, into scientific knowledge that could be easily shared among the workforce.

The aim was to bring consistency to its products, and objectively redefine the parameters used by both the business and the wider textile industry to describe fabric quality.

NPL experts in dimensional metrology worked with artisans at Johnstons of Elgin to observe how key fabric quality characteristics were graded. By exploiting advanced microscopy and data analysis capabilities the NPL team were able to discover a correlation between the subjectively determined fabric grade and a number of objectively measurable parameters. A high-speed sensor system was then developed by NPL to bring the measurement capability directly to the factory floor. A prototype of this system was successfully demonstrated on the fabric inspection line at Johnstons of Elgin and is ready for machine mounting.

Through bringing in NPL's specialist expertise, Johnstons of Elgin have been able to define a simple to understand one-to-five tolerance scale for its quality control and it is planned to further integrate the sensor technology upstream in the manufacturing line to realise further benefits and cost savings.

This has not only given the business a competitive, innovative edge to managing the consistency of the finish of its products but has also enabled its customers to choose their preferred finish in a way that was not previously possible.

For more information on how A4I can help you visit A4I.info





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#### Impact

The project has not only had a huge impact in the efficiency of its finishing processes but also in the innovative mindset of the business.

It has led to a significant reduction of reworking, an increase in productivity and reduction in waste.

The delivery of end products to the customer is more guaranteed, with fewer expensive quality control issues. In addition, Chimaeze Onyeiwu will continue to work with the business on an ongoing basis and now holds the position of Procurement and Technical Director.

Johnstons of Elgin is now partnering with NPL to industrialise the methodology and international competitors are turning to the business to provide guidance on how to achieve such unprecedented levels of finish quality.

In addition, innovation has now become a central ethos and value of the company.

#### **A4**|

A4I is a programme that gives UK businesses, of any size, access to cutting-edge R&D expertise and facilities to help solve problems that they have been unable to tackle using standard techniques. The focus is on solving issues affecting product cost, reliability or lifetime and production problems.



Research and development is now part of the conversation we have in all departments. Our managers now need to have improvement projects and R&D is part of our DNA going forward. I don't think that will ever stop. Working with NPL on the A4I project has enabled us to be both more introspective and made us realise we can reach out and bring in expert help. That will help us immensely in the future and in our ability to compete in a worldwide market.

#### Tom Syme

Operations Director at Johnstons of Elgin

