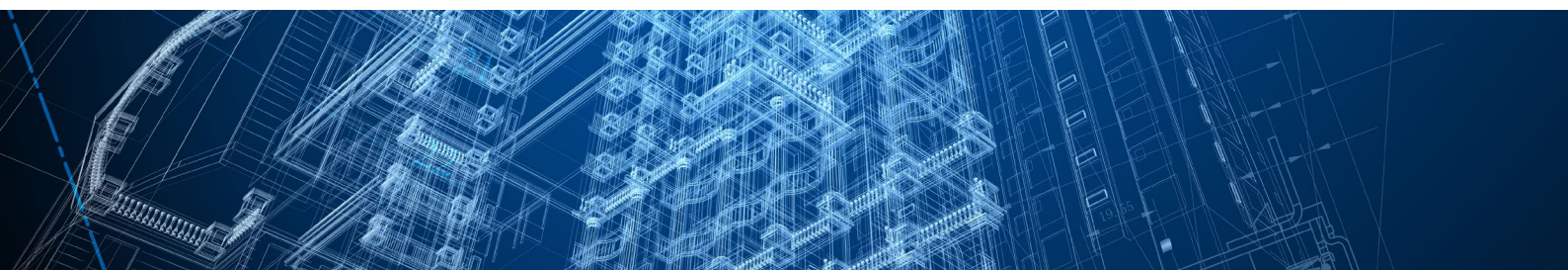


**PAS 440:2020**

# Responsible innovation – Guide



Innovate  
UK



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# Preface

We have all heard someone playing a musical instrument out of tune. It sounds pretty unpleasant. When two people play together, and they are not properly in tune, it sounds even worse. The more people playing, and the further separated their tuning is, the worse it gets. A large modern orchestra can consist of over 100 musicians, depending upon the piece they are playing. That many people playing out of tune would sound truly awful which is why, before concerts, we hear them honing their tuning to be perfect. It is customary that everyone tunes to the note A (above middle C) played on the oboe. The frequency of the note the oboe plays, concert pitch, is 440 Hertz. Only when everyone's playing is rooted to the same tuning note (usually 440 Hz) does it sound good.

This is the inspiration for the number of this Publicly Available Specification (or PAS) on responsible innovation. Just as the different sections and instruments in an orchestra only play beautifully together when they are tuned to the same note, so too is innovation more successful when the different stakeholders in a value chain act in an agreed and coherent way. New products, services and processes that work for all parts of a supply chain, and are accepted by wider society, have the potential to flourish. They are well positioned to serve the interests of companies, suppliers and customers and citizens. Where these conditions do not apply then the new products, services and processes are more vulnerable, and far more likely to fail.

In his Nature Paper of 1880 (ELLIS, A. *The History of Musical Pitch*. *Nature* 21, 550–554, (1880)) Alexander J Ellis described more than 30 different pitch systems in use across Europe during the 18th and 19th centuries. Similarly, when we look at responsible innovation today, we find a large number of different approaches being adopted by different organisations, working in different technology and industry areas, with different stakeholders and societal expectations. Before the creation of PAS 440 there was no single overarching point of reference for innovators wishing to develop their new products, services or processes in a responsible manner.

It is hoped that PAS 440 might simplify and bring coherence to the area of responsible innovation. It provides guidance and help to innovators and stakeholders on how innovation can best be taken forward.

We are keen to track how well it does this. For this reason we are making it available at no charge, but would ask that companies using it share their experiences of doing so with us, so that we can improve future versions of the document and inform future programmes in specific innovation areas. If you are reading this introduction, this might well apply to you. Please reach out to us on [PAS440@innovateuk.ukri.org](mailto:PAS440@innovateuk.ukri.org) providing your contact details so we can, at the appropriate review point, send you a user survey and keep you up to date with future standards developments.

Thank you for innovating responsibly.

**Paul Mason**  
Director of Responsive Programmes  
Innovate UK

# Foreword

This PAS was sponsored by Innovate UK. Its development was facilitated by BSI Standards Limited and it was published under licence from The British Standards Institution. It came into effect on 31 March 2020.

Acknowledgement is given to Joyce Tait of the Innogen Institute, University of Edinburgh, as the Technical Author of this PAS and to Paul Mason, of Innovate UK for his contribution to the drafting of the PAS, and to the following organizations that were involved in the development of this PAS as members of the steering group:

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Acknowledgement is also given to the members of a wider review panel who were consulted in the development of this PAS.

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This PAS is not to be regarded as a British Standard. It will be withdrawn upon publication of its content in, or as, a British Standard.

The PAS process enables a guide to be rapidly developed in order to fulfil an immediate need in industry. A PAS can be considered for further development as a British Standard, or constitute part of the UK input into the development of a European or International Standard.

## Use of this document

As a guide, this PAS takes the form of guidance and recommendations. It should not be quoted as if it were a specification or a code of practice and claims of compliance cannot be made to it.

## Presentational conventions

The guidance in this standard is presented in roman (i.e. upright) type. Any recommendations are expressed in sentences in which the principal auxiliary verb is "should".

*Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.*

Where words have alternative spellings, the preferred spelling of the Shorter Oxford English Dictionary is used (e.g. "organization" rather than "organisation").

## Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**

# Introduction

Companies are increasingly facing demands that their products, processes, services and business models are developed responsibly. However, these demands are likely to vary depending on the nature of the innovations involved, the anticipated benefits and risks, and where they accrue. PAS 440 will help innovators to work through the demands of innovating in a responsible manner and to demonstrate their responsible behaviour to interested stakeholders. It is a practical guide that adds value to the innovation process and helps to improve the robustness with which potential problems can be addressed. It also attempts to be realistic about the demands on company resources (time and money) in often fiercely competitive environments.

Different challenges can arise at different stages in developing innovation, and societal attitudes to, and demands for, specific innovations evolve over time. PAS 440 particularly addresses the needs of companies developing transformative innovations that can lead to:

- the creation of new modes of production and new markets;
- sectoral transformations and the displacement of incumbent products or even companies; and
- the creation of entirely new sectors with significant societal and economic benefits.

At the early stages of development of these innovations, there might not be an existing regulatory system to guide the innovator or a pre-existing business model to be followed. Alternatively there might be a need to create a new value chain or a new role for a company in an existing value chain. This PAS is also helpful in the case of some incremental innovations, where the innovation landscape is mature, where new processes or other changes are being considered, or new markets are being opened up, particularly where they attract the interest and attention of members of the public.

PAS 440 is thus relevant where significantly new types of innovation are being undertaken. This could be in any market, for example, healthcare, transport, financial services, construction, aerospace, and agriculture/food production, and based on new developments in any technology including, but not limited to, artificial intelligence (AI), big data, robotics, materials sciences, photonics, biotechnology, sensors, electronics, physics or chemistry. It is intended to help

companies to manage the process of responsible innovation across all development stages up to and beyond market launch and gives guidance on charting a path through the potentially conflicting aspirations and demands of a broad range of different stakeholders.

Following the guidelines in PAS 440 can lead to additional benefits for the company, including, depending on the specific circumstances:

- long-term cost and risk reductions;
- more resilient new product/service offerings to potential customers;
- improvement of societal trust in the company and maintenance of social license to operate;
- improved relations with investors and greater investor confidence in the company;
- greater attractiveness as an employer;
- better supply chain relationships;
- improved reputation and brand value;
- increased innovation capabilities;
- improved ability to communicate the value of products and services to investors, companies, customers and citizens;
- better relationships with governments, regulators and local communities; and
- improved capacity for long term planning and sustainability.

PAS 440 has been designed to minimize the associated costs of compliance for companies and the above benefits would be expected to outweigh these costs, particularly taking account of the avoided costs of any mistakes. It supports companies in demonstrating that they are innovating responsibly whilst taking account of their needs to continue to innovate in a timely manner and to ensure that they remain competitive internationally. Responsible companies can therefore anticipate delivery of the positive results of their innovations while minimizing unintended or unforeseen negative consequences.

Responsible innovation (RI) also contributes to the Europe 2020 Strategy on the creation of “a smarter, greener economy where our prosperity will come from research and innovation ... [and] research and innovation must respond to the needs and ambitions of society, reflect its values and be responsible” [1].

## 1 Scope

This PAS provides guidance for companies that wish to innovate responsibly and to demonstrate their responsible behaviour by helping them to structure their thinking and by guiding their actions.

This PAS is relevant to all those taking new products, services or processes to market, and is also of interest to a company's wider stakeholders including: members of the public, customers, scientists/innovators, regulators/policy makers, financiers and investors, suppliers, current and prospective employees, and collaborators.

There are two main elements of responsible behaviour by companies:

- a) company-level responsibility, applying to organizational behaviour in general (Clause 6); and
- b) innovation-level responsibility, specific to each innovative development or class of developments (Clauses 7 and 8).

## 2 Normative references

There are no normative references in this document.