White Paper for Service Providers

Standards – Enabling Innovation and Change in the Digital Economy

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The IET Mountbatten Lecture 2017

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Chapter 01

Industrial development – the role of standards in stimulating growth, innovation and trade

This talk is about standards, a subject which, I have discovered, means something different to everyone. What I want to do over the next hour is to re-base our understanding of this useful but little understood tool for industry and hopefully to excite you about the potential that standards bring to underpin the next phase of industrial growth through supporting innovation, productivity and trade. I want to focus on the role of standards in the digital economy, which is sweeping towards us, and how we might exploit, even reinvent this medium as a powerful enabler for economic advantage in the global economy.

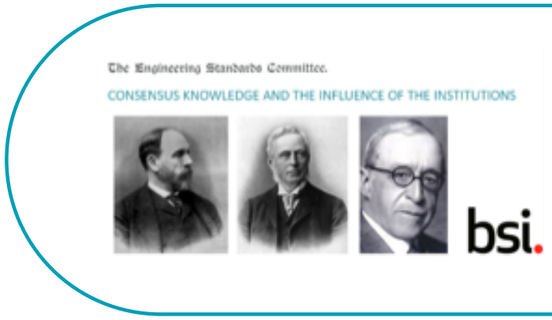
But first I want to explain how we got here.

Consensus knowledge and the influence of the institutions

One of the underlying purposes of the great professional engineering institutions such as the IET is to act as the guardians of knowledge. Knowledge of what good practice looks like. For well over 100 years, the institutions have hosted meetings to debate technical papers and challenge authors on their propositions. Thus it was that the boundaries of knowledge for the engineering profession were pushed back and new concepts accepted into practice.

Alongside the development of leading edge knowledge ran the development of what we may call consensus knowledge. This type of knowledge had a different purpose for the profession. Rather than academic distinction, the purpose of consensus knowledge is industrial productivity.

In 1901 Sir John Wolfe-Barry, President of the Institution of Civil Engineers (ICE) from 1896-98 and Sir Douglas Fox, President from 1899-1900, held the first committee meeting of the Committee on Standard Sections, which became the Engineering Standards Committee (ESC) later that same year.



One of the key figures at the time was the Electrical Assistant Secretary of the Engineering Standards Committee, Charles Le Maistre, a British electrical engineer and a member of the Institution of Electrical Engineers (IEE), parent of the IET. In June 1902, probably encouraged by Le Maistre, the IEE was invited to nominate members to the ESC. A new Committee on Electrical Plant was quickly formed with three subcommittees, on generators, motors and transformers; on cables; and on telegraphs and telephones. By 1905, four electrical reports had been published and seven more sub-committees added to the original three.

There was also considerable interest in international collaboration and in 1906 the UK hosted the meeting that led to the foundation of the International Electrotechnical Commission (IEC) at the Cecil Hotel in London, barely 100m from here.

Le Maistre was appointed the first General Secretary of the IEC, a post that he held until his death in 1953, whilst also doing my job of running the national standards body from 1916 to 1942.

A legend in the IEC, Le Maistre became known in international standardization circles as the “deus ex machina”, the god-like figure who appears in Greek tragedies to rescue everyone.

In 1918, presumably under Le Maistre’s spell, the professional institutions established the ESC as an independent body called the British Engineering Standards Association (BESA) and following the granting of a Royal Charter in 1929, the association was renamed the British Standards Institution (BSI) in 1931.

The links between the UK and international standardization continued with the formation of ISO. After initial meetings in New York and Paris in 1945 and 1946, it was Le Maistre who, in yet another capacity, this time as General Secretary of the short-lived UN Standards Coordinating Committee, arranged for BSI to host the 12 day conference at the Institution of Civil Engineers from 14 October 1946 where the resolution was passed to establish the International Organisation for Standardisation (ISO).

Supporting innovation, productivity and trade growth

In his opening address to the 1946 conference, Lord Woolton, then President of BSI, explained British industry's attitude to standards in words that you may find familiar:

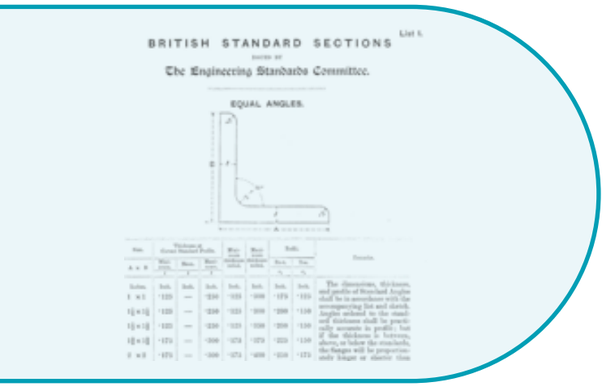
"In Great Britain we have been actively involved on this work for some time, but during the course of the war it has been brought very clearly indeed to our notice how very much better off we should have been during that period, when it was necessary to have enormous productivity, if we had taken a little more notice of the advice that the British Standards Institution had given to our engineering firms."

The Engineering Standards Committee had in mind from the outset the importance of standards for commerce. Its first project was to agree on a set of dimensional requirements for steel sections and its very first report, known as BS1, was published in February 1903.

This is what is looked like. It is what we would call today, a standard for interoperability. Engineers used the new standard as a shorthand form of communication with a supplier. The supplier knew what was required and how it would be measured.

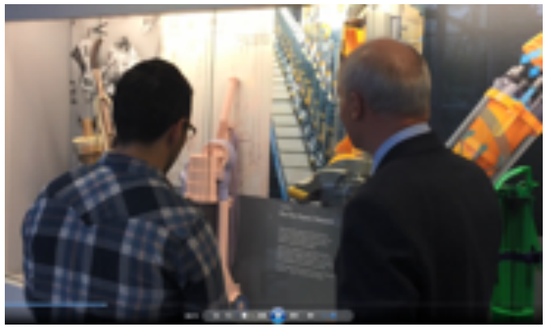
Standards based on stakeholder consensus that set out specifications for general use bring their greatest advantage when they are universal. A client could invite several suppliers to compete on the same basis and yet be confident that whichever supplier were selected, the component would fit. Suppliers are incentivised to compete on quality and price.

Innovation becomes less risky, as standards provide one of the essential business tools to support new product development and market access.


BRITISH STANDARD SECTIONS

The Engineering Standards Committee.

EQUAL ANGLES.



Visiting the Dyson research centre in Gloucestershire a few weeks ago, I talked with their standards team about the role of standards and innovation.

The Dyson view is that (and I quote),

"Well drafted and widely adopted standards can move technology forward and remove barriers to global trade. Effective standards can encourage invention and investment in the development of new technologies."

This is a fundamental theme of this lecture

The UK engineering profession was not alone in recognising the power of standards. From the late nineteenth and throughout the twentieth century, other industrialised countries came to the same realisation that in the fields of engineering and technology in particular, it was important to harness good practices and to share these widely as a basis for economic development.

Germany was a particularly important player with its two great standardization organisations DIN (founded in 1917) and VDE (founded in 1893) in the electrotechnical domain, but so too were the widely respected US professional engineering bodies, such as the American Institute of Electrical Engineers (AIEE, now IEEE) founded in 1884 and the American Society for Testing and Materials (ASTM), founded in 1898, which were engaged in standardization activities from the outset.

The Role Of Standards For Industry Is Not Studied In The UK

Despite this, it is a fact that the role of standards in economic development is not well studied and certainly not well taught in the UK. Today, to our knowledge there is not one module on the role of standards for enterprise in any MBA programme in the UK, nor in any university engineering degree course. There is plenty of advice on intellectual property, patents and copyright protection, but nothing on the role of standards in industry or how standards form the backbone of global, regional and national market frameworks, within which engineering companies and professionals need to compete and prosper.

We need to correct this

Britain thinks

Amongst many in the engineering profession, especially in high usage sectors, the role of standards has come to be thought of largely as a compliance tool, rather than a body of knowledge and a strategic enabler for industry.

Recent market research sponsored by BSI and carried out by independent consultants BritainThinks found that in high usage sectors, where standards have become established and indispensable, they are seen as a necessary tool for compliance. Attitudes in low usage sectors by contrast, reflect the view that there is a significant competitive advantage in adopting standards, and senior figures in these sectors see standards as a tool for best practice and quality improvement.

This is the context within which we need to work. It is not how voluntary standards are perceived in Germany, of course.

You only have to look at the front cover of the German national strategy for Industrie 4.0 to realise that German industry sees standards as a fundamental tool for market development.

The flow chart below shows how the fusion of industry understanding of market relevance and the stability and security provided by the role of standards accelerates innovation.

The perception amongst many in the UK engineering sector that standards are about compliance rather than an enabler of economic growth is unfortunate. Over decades this attitude has created a lost opportunity for industry and government in the UK, but also in many other countries, particularly amongst the developing and emerging economies.

At the root of this misperception has been widespread confusion over whether standards are a voluntary tool for industry, a contractual obligation (between supplier and client) or a legal requirement imposed by government.

The failure by industry and government to distinguish between standards and regulations has caused unnecessary drag on economic growth potential. It continues to pose a significant risk to those national economies that fail to recognise that the greatest value from standards comes as a tool for accelerating innovation and market development, rather than the more limited value derived from using standards to describe a means of conformity with a legal requirement.

In fact, as we shall see, in the European system just 20% of European standards are associated with regulation, and almost all of these remain voluntary anyway. Where regulations originating in the UK refer to standards, they maintain the voluntary character. There are only a few where standards are made a legal requirement, such as for fire safety of furniture and nightwear.

Dr Tian Shihong, Administrator of the Standardization Administration of China (SAC)

"Thank you Scott for the opportunity to comment on the role of international standards in China. China is a very active member of ISO and IEC and has been encouraging stakeholders to participate in international standardization activities, and encouraging Chinese enterprises and experts to participate in the development and revision of international standards. China has been committed to the promotion and adoption of international standards in China, as well as harmonization of Chinese standards with international standards. China sees the role of international standards as a high priority for its industries, which want to work to one standard, used everywhere."

"China sees the role of international standards as a high priority for its industries, which want to work to one standard, used everywhere." We'll come back to this.

The value of standards lies in the transaction

Standards are essential for a company to explain to its employees, customers and supply chain what it stands for and what it is offering, which today means corporate social responsibility, good governance, resilience, risk management, cybersecurity, not just quality or regulatory compliance.

But the new frontier for business is no longer quality, it is trust. And in the world of digital products and services it is also privacy and security.

So, for me the productivity, competitiveness and growth of the engineering and technology sector is a matter of delivering enterprise success. It is not simply about products, but about the subtle reputational issues that touch on a wide range of other stakeholders, also essential to the future of business: not just suppliers, but customers, governments and regulators in particular.

Standards have no inherent value unlike a commodity, which does. Their value lies in the transaction between two parties: customer and supplier, regulator and industry, retailer and consumer. Standards provide a means for one party to provide assurance to another that they are following good industry practice. The value of standards to both parties then derives from the increase in trust and common understanding between them.

Consensus standards provide the easy way for industry, society or governments to set out their commitment to good practice. 95% of national standards in the UK published each year are international or European. National standards in the UK therefore demonstrate a commitment by UK industry to the alignment of national business practice with international practice.

Last Friday I was with the director of standards for China, Dr Tian Shihong, Administrator of the Standardization Administration of China (SAC). We work closely together on international standards and I invited him to comment on the importance of international standards in China and China's commitment to the model that we follow in the UK of one standard, used everywhere.

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of standards published are international or European

Standards are a passport to trade

So let's see standards for what they really are: a structured approach to the definition of what good looks like, dynamic, stakeholder driven, consensus based with ongoing governance and global reach. Standards are regularly reviewed and easily updated as technical development proceeds.

Standards are a passport to trade, a common platform for industry to build competitive advantage.

Standards aren't competing with the expert knowledge held in the professional institutions, or in the academic journals and publications.

Standards are certainly not competing with regulation. Instead, we should see standards as usable, consensus knowledge that draws on wide input and that is governed by those affected day to day.

The model of full stakeholder engagement, open public consultation and consensus can achieve a highly valuable outcome; a shared view of the current state of knowledge, not fettered in regulation, or challenged in an academic journal, but usable in millions or indeed, billions of daily transactions that oil the wheels of economic activity: of trade, innovation and growth.

Let me be absolutely clear. Standards are a differentiator, not a level playing field. The law creates the level playing field in all market economies. Standards enable market access and support business performance improvement.

Standards are a passport to trade

Chapter 02

Innovation and development

Let me turn now to the question of innovation

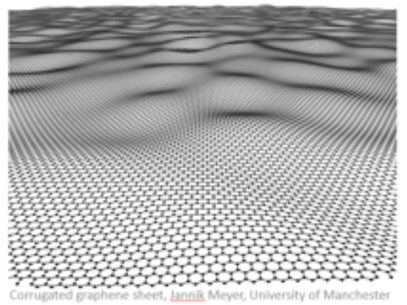
The rise of computerisation in the late twentieth century, enabling the automation of production, is generally thought of as the third industrial revolution. We are beyond that now, and the fourth industrial revolution, the digital revolution, is in motion, including what the Germans describe as Industrie 4.0.

The digitisation of the UK and global economy is a tsunami. Its effects appear modest at first but as we approach a tipping point in availability and use of data the impact of the digital revolution will be huge and rapid. We are already seeing traditional business models being disrupted and new models emerging. Digitization has the potential to flip leading economies into an entirely new model of labour and production, a connected economy.

McKinsey Global Institute in their report Digital America, published in 2015, described it as 'a tale of the haves and the have mores', an economic revolution where the gap is widening between those that embrace the wave of change and those that follow. There is a great risk that it becomes 'a winner takes all' world, which I will return to later.

The role of consensus knowledge has never been more important in underpinning technological development, ensuring that we can build on the present and deliver more with less, each and every time we innovate.

HOW DOES CONSENSUS KNOWLEDGE SUPPORT INNOVATION?



Corrugated graphene sheet, Jannik Meyer, University of Manchester

So how does the idea of consensus knowledge support innovation?

Let me give a specific example to illustrate the role of standards in innovation. The UK is known for its pioneering scientific research into graphene as a new 'wonder material'. China is very interested in the opportunities for manufacturers to commercialise graphene. Last year Dr Tian Shihong visited the National Graphene Institute (NGI) in Manchester to see the UK capabilities for himself. In fact, manufacturers in China are already starting to place products incorporating graphene on the market.

The challenge for industry is that to date there is no international standard defining graphene in ways that would accelerate commercialization, meaning that when you think you are purchasing graphene, you may be purchasing graphite. UK scientists define graphene as a single molecular layer, but scientists elsewhere may take a different view and this has a direct impact on industry investment and the potential for market development. Today both researchers and industry are exposed to the absence of any consensus on the actual nature of graphene from the perspective of a manufacturer, consumer or regulator.

Developing internationally agreed standards for industry in this area would bring immediate benefit to everyone.

To encourage this, the UK-China Standards Cooperation Commission (SCC), which was formed last year, building on our 2013 standards agreement, has formed a dedicated working group of UK and Chinese technical experts to agree on a common approach.

INNOVATION IN BUILDING INFORMATION MODELLING (BIM)
www.level2BIM.org

Moving from emerging technologies to industry practice, Building Information Modelling (or BIM for short) is an example of standards acceleratig innovation in the construction sector in the UK. Funded by government, a suite of UK developed standards on the data formats used in design, construction and operation is now available. First use of these standards has led to considerable capital cost savings with the full expectation of substantial through life savings.

These standards, known as the PAS 1192 series, range from data formats to cybersecurity. They are standards for the digital age, recognising that the modernisation of industry for the benefit of clients and users requires a common approach to the digital information on which the value of the built asset, building or infrastructure, is now determined.

With a comprehensive data set available to owners, operators and users, from design to decommissioning, there is not only increased efficiency but seamless interoperability, just as Wolfe-Barry anticipated 116 years ago.

Today, with the support of other nations, BSI has offered the PAS 1192 suite of standards to the world through our membership of ISO. These standards will soon become the globally accepted practice and adopted worldwide. This creates an immediate and evident competitive advantage for those early adopters, who are already familiar with this approach. Engaging with good industry practices for their products and services, processes and people is a simple and open way for businesses everywhere to find out what good looks like.

We have scarcely begun to exploit the true value of standards in the global economy. This is despite the evidence that standards accelerate enterprise.

Independent economic analysis by consultants Cebr in 2015 found that for the UK, 28.4% of annual GDP growth is attributable to use of standards, equivalent to £8.2bn in 2014 prices. Standards play a key role in facilitating productivity. Cebr found that 37.4% of UK productivity growth can be attributed to standards. Standards help companies to realise global ambition by underpinning global trade. 41% of SMES are more likely to export if they are using standards. Indeed, Cebr found that overall £6.1bn of additional UK exports per year can be attributed to standards.

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A brief summary of where we are

I have argued that standards are a form of industry knowledge that brings added value as a differentiator through the consensus process and independent governance. Industry, governments and consumers use standards as a mechanism for building trust in the transaction between them.

I have discussed the role of standards in innovation. Where used smartly, standards can be an accelerator for commercialisation of new products and services, an alternative to regulation and a tool for industry transformation.

I have emphasised that the value of standards lies in the transaction between two parties, a company and its customers or its suppliers, an employee and an employer, government and industry. Standards build trust.

It is of course possible that standards are misused, either accidentally or deliberately, to create technical barriers to trade or to prevent new entrants to the market, but so it is with all tools of the market. Intellectual property tools are notorious for their exploitation. Regulatory frameworks similarly can be used to promote or suppress market activity.

In the formal standards world, there is an international structure of organisations led by ISO and the IEC, that oversee the cooperation of the member nations in creating a single international standards model for global economic development. At regional level, there are similar private organisations that provide a regional forum for international cooperation. In Europe, these are known as the European Standards Organisations, CEN, CENELEC and ETSI.

Let me turn now to the question of how standards are used in international market structures and the role played by the international standards organisations and in the regional context, the European organisations.

Chapter 03

Market structures

Importance of market structures for industry cooperation – success of European and international models

Market structures derive from a combination of regulation, intellectual property rules and industry standards.

Regulatory frameworks are created by national and local governments to establish legal requirements for the conduct of business. In many countries, governments 'regulate' standards, either drafting technical requirements directly into law, or by referencing industry standards as a legal requirement for some purpose.

This is a route frequently taken by developing countries which seek to strengthen their local practices by the imposition of industry standards through regulation. Such countries may recognise the power of market pull to drive change, but often they see the regulation of standards as a necessary step on the path to the adoption of international standards, somehow 'raising' domestic standards by forcing compliance with quality schemes and marks.

Speaking to representatives from the Ministry of Commerce and Industry of the Indian government and the Bureau of Indian Standards a few weeks ago, they emphasised to me the challenge of how their industry can 'reach' the level of international standards. In India, standards are seen by government as something that must be regulated, or industry will not comply.

Is this working? No

My view is that international standards should be seen as a platform, a passport to trade and to do business. They are not the top of the ladder but the plug and play of the global economy, a common platform on which deals are done and economic resilience is built.

There are more advanced standards in niche fields that are not 'international'. There are national standards that reflect local practice. The key is to ensure the structure of industry standards is consistent, coherent and non-conflicting wherever possible.

Regulation of industry standards as happens in India creates a culture of antipathy and even blame, usually of the prevailing government, rather than a culture of cooperation and aspiration.

It is critical that industry, consumers and governments recognise the difference between technical specifications written or referenced in regulation that become legal requirements, and standards referred to as supporting instruments.

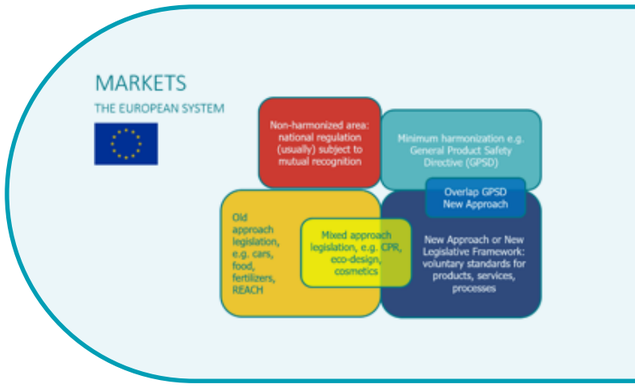
In the European context, for example, the legislation that follows the model known as the New Approach covers a large part of the market for goods, particularly products of lower complexity and hence, lower potential risk.

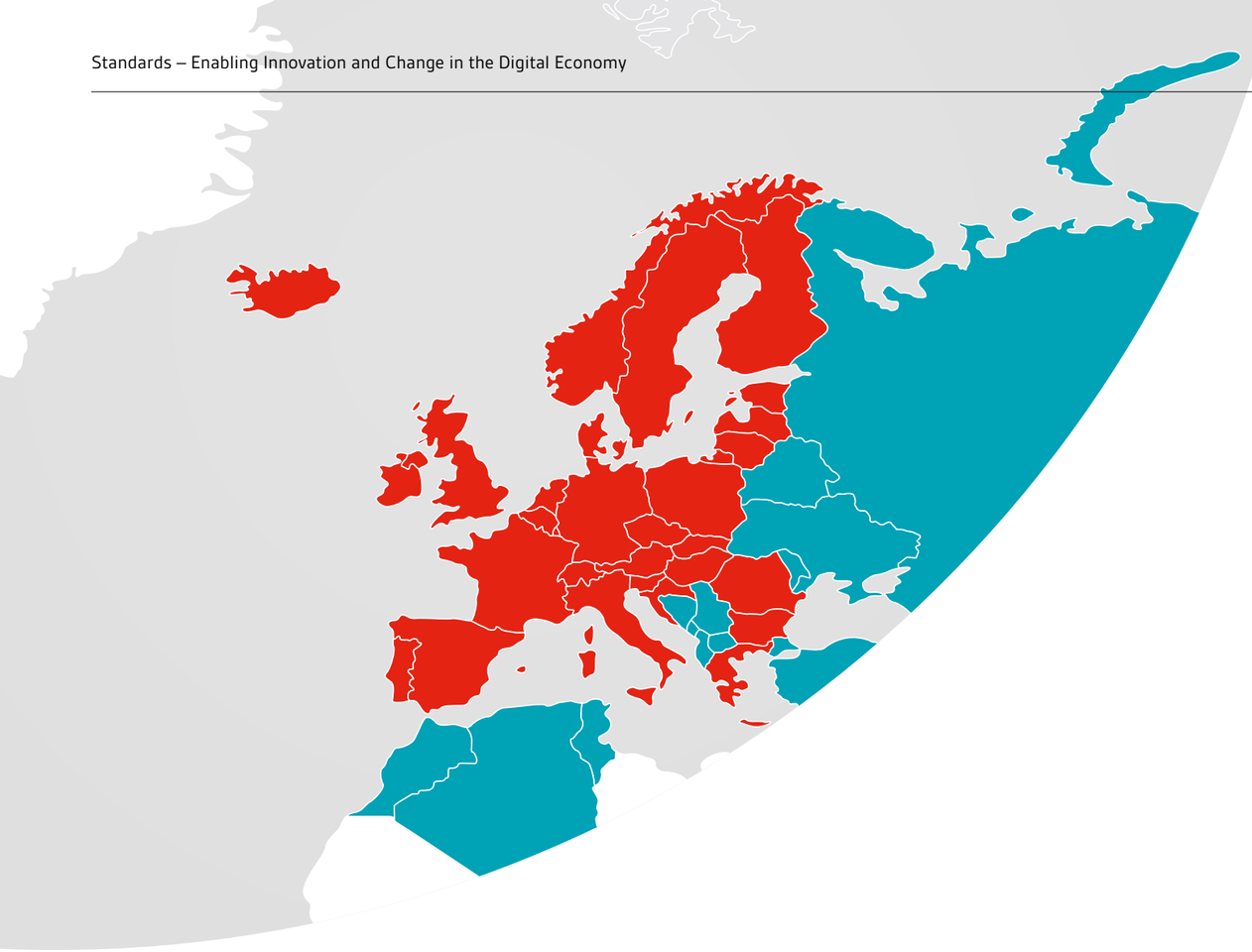
Standards are cited in European regulation under the New Approach as 'a means of compliance'.

The central feature of the New Approach is that the harmonization is restricted to the 'essential requirements': products must be safe, presenting minimum risk to users, and must restrict hazards from mechanical, chemical and other properties of the product. These requirements are defined in the legislation in a high-level, performance-based way. It is then left to the manufacturers to decide how they wish to demonstrate that they have met the requirements.

Industry standards cited under the New Approach provide a presumption of conformity for a manufacturer claiming compliance, but the ultimate test (should there be a challenge over a particular product or incident), is whether that particular product or incident breached the law, not whether it breached the standard.

The New Approach is not comprehensive, however, and it is important to stress that there are many industrial sectors where the other more traditional approaches to the harmonization of product regulation continue. This diagram shows how, in the universe of products manufactured and placed on the markets of European countries, a number of well know sectors remain heavily regulated due to specific legislation, including pharmaceuticals, automotive and others. There are also areas where the harmonization model is mixed, such as the Construction Products Regulation (CPR), where voluntary standards were eventually made mandatory.





ISO and IEC have led the way in promoting the international model for the use of voluntary, consensus, industry standards in international trade. The World Trade Organisation (WTO) Technical Barriers to Trade Committee refers, in a Decision in the year 2000, to the six principles for the development of international standards: transparency, openness, impartiality and consensus, effectiveness and relevance, coherence and the involvement of developing countries.

Standards development in the formal landscape happens through the national delegation principle. There are no faceless bureaucrats writing standards, in Geneva or Brussels. A country will take responsibility for hosting the secretariat of a standards project or committee, and other countries will participate either directly or by shadowing the work.

At European level, there are 34 countries in the European system, including the 28 members of the EU, the EFTA countries, Turkey, the Former Yugoslav Republic of Macedonia (FYROM) and recently, Serbia, which joined in November 2016. The ESOs are not agencies of the EU but private organisations, managing the body of European standards (ENs) that are either drawn from the ISO and IEC catalogue of work or are 'home-grown', where there is a European interest but no suitable ISO or IEC activity to work with.

BSI, along with other National Standards Bodies, maintains the infrastructure for national experts from industry, society and government to participate in all of these forums, with the specific intent that there should be no conflicting standards in the national marketplace.

We aspire to agree one standard for any given business issue or aspect of a product, ideally written with the benefit of UK input and then adopted from the international system into the national catalogue as a British Standard. In fact, UK expert activity in international standards development is very high indeed. The UK participates in 95% of all ISO committees, higher than any other country. Germany and China follow, both at 93%.

Our priority is to work at the international level first and to achieve a consensus there, so that we can use that consensus both in the European and the national context.

Avoiding conflicting standards through the process of adoption

Perhaps the single most powerful element in the removal of trade barriers between nations is the adoption of international standards and the withdrawal of conflicting standards to create a coherent and consistent set of industry standards in any national economy, which match an identical set of standards in other economies, the passport model.

In the UK, BSI publishes around 2,500 standards and withdraws around 1,500 each year in a constant process of revision and alignment with international standards for the benefit of industry.

Let me give you an example. For reasons of infrastructure, it is easier for Kenya to trade with Europe than with West Africa or even South Africa. This activity has brought to Kenya a keen understanding of the role of national standards, based wherever possible on international standards, and the avoidance of conflicting standards in the domestic market.

Charles Ongwae, Managing Director of KEBS, the Kenyan Bureau of Standards, explained to me how it works, during a recent visit to Nairobi.

Kenya recognises the primacy of international standards, developed by industry experts through ISO and IEC under the national delegation principle, and the importance of adopting these as Kenyan national standards in place of local practices wherever possible. This is the same model that we use in the UK. It is the international model. The same international standard can be adopted as a Kenyan national standard, KS ISO 9001 and a British national standard, BS ISO 9001.

Kenya follows this international model. ISO or IEC standards become Kenyan national standards, replacing any prior standards covering this field. Kenya has a substantial programme of national standards development activity across many sectors. Here again, they first check whether there is an international standard available, 'we don't want to reinvent the wheel', Charles said, or national standards in any other country that could be used directly.

Simplification of the market standards landscape reduces barriers to trade

In Europe this system of the adoption, wherever possible, of international standards to ensure a simplified market landscape has been extremely successful.

Across the 34 countries of the European system, the number of industry standards that might have been needed for companies to trade has been reduced over 30 years from a figure of around 160,000 national standards to about 20,000 European standards, a huge streamlining of the regional market.

In the UK, as I mentioned earlier, around 95% of our standards work at BSI is on the development and adoption of international and European standards. The UK hosts around 200 international committees, including all of the leading international business standards, covering quality management, environmental management, occupational health and safety and the best seller last year, anti-bribery. All of these standards help to build more resilient and productive supply chains across the global economy.

So how will all this be affected by Brexit?

Brexit

The UK is a leading player in the international and European standards systems. BSI, in its role as the National Standards Body, provides that infrastructure for UK industry to participate. In the White Paper published on 23 January 2017 by government on 'The United Kingdom's exit from and new partnership with the European Union', there is a useful statement on the national position and BSI's responsibility to support business and industry through this process.

'The European Standards Organisations (CEN, CENELEC and ETSI) are not EU bodies', it states, 'though they have a special status in the EU. Approximately 25 per cent of published European standards have, in part, and whilst still voluntary, been developed by the European Standards Organisations as a result of requests from the European Commission. This subset of standards provides businesses with a way of demonstrating compliance with EU product laws', as I have already explained.

The government White Paper goes on to say, 'We are working with BSI to ensure that our future relationship with the European Standards Organisations continues to support a productive, open and competitive business environment in the UK. '

CEN, CENELEC and ETSI are private organisations that provide the means by which UK experts from industry, society and indeed, government, can influence the content of consensus standards that will be adopted identically by 34 countries across Europe, providing a basis for 'plug and play' international trade. The commitment of those countries to the withdrawal of any conflicting national standards adds to the value of UK participation in the system.

Remember that the European standards that are adopted as UK national standards are not in general an alternative to international standards, they are addressing other areas or requirements. The ambition is that they are a complementary set of documents, not an overlapping set. BSI works hard with the UK experts and our European partners to minimise any overlap between the international and European work.

BSI's expectation is that by continuing to follow the international standards model in the UK and by BSI adhering to the requirements of European Regulation 1025/2012, then the UK can continue post-Brexit, to take an active part in the governance and in the standards-developing committees of CEN and CENELEC as a full member of those organisations.

People ask, 'But what will happen over time if regulatory requirements diverge between the UK and the EU?'

The simple answer is that there is already a degree of regulatory divergence across the 34 countries of the European standards system. Flood protection regulations in Germany are different to the UK. The UK has additional furniture fire safety regulations that go beyond those of other European countries. This is accommodated in the European standard through an Annex for the UK.

You might also reflect on the wide divergence of building regulations across Europe and even across the UK. Scotland, England and Wales all have different building regulations. Scotland is the toughest, but the standards used to support industry to deliver products and services are the same. There is one set of Eurocodes for structural design (chaired by Steve Denton, a UK engineer) with multiple national annexes. And so on.

De-regulation is an interesting question. What if the UK lowered its regulations for toy safety, for example? Or environmental contamination?

But is this likely? Or even practical?

In fact, many regulations affecting products on the market in the UK are already high level, performance-based regulations, so do not contain any limit values. Limits are defined by industry and other stakeholders in voluntary standards. This would mean that 'lowering' or 'raising' the bar would be quite difficult to do.

And anyway, would government allow the UK to become a dumping ground for less safe products that cannot be sold elsewhere in the European system? Industry won't write 'lower standards' for itself that conflict with international standards (industry wants one standard everywhere, as we heard from Dr Tian Shihong in China) so this could only mean that it would require a regulatory act, a technical regulation, to reduce safety or quality requirements.

It seems unlikely. Developing countries (like Kenya) aspire to participate in the international standards system and to see their industries join the global economy. China wants 'one standard, used everywhere'. It seems unlikely that the UK would abandon the international model of standards for trade, writing new technical regulations that would render UK business and industry less competitive by permitting the importation of cheaper, less safe, lower quality products and services. I suggest this would not be a winning industrial strategy, post-Brexit.

Lord Woolton would turn in his grave.

One important country operates a different approach. America.

The international standards model is followed in all major markets except the US, where market access is largely controlled at State level rather than Federal level, and multiple standards may be referenced in regulation alongside each other. Market access, even across State boundaries, is a challenge.

Last month, when I was in Washington, I asked Joe Bhatia, President of the US National Standards Body, ANSI, and director of standards for the US, to explain why the US system is different.

Here he is.

As Joe explained, the US system is unique they are prevented them from adopting international standards in the way that other countries do. US experts are very active in the international standards organisations ISO and IEC, but also in their own private standards development organisations, such as IEEE and ASTM, whose standards are used all over the world, and hundreds of other sector specific or specialist standards organisations.

In the US there is no formal mechanism for the withdrawal of conflicting standards. New standards are simply published alongside existing standards, in what is called a 'multiple path model'.

There is no simple route to the demonstration of conformity, either for client or manufacturer, and parallel models may co-exist until one or other succeeds. The classic example of this problem was the long running struggle for market supremacy between Betamax and VHS in the 1980s.

The multiple standard model creates a type of free market structure where granting reciprocal market access to other trading blocs committed to adoption of international standards is not feasible.

An alternative solution to free trade agreements

However, there is a mutual recognition solution that retains the 'passport to trade' model of international standards, but provides plenty of scope for trade negotiators.

We call this mutual recognition of regulatory outcome. Regulators can agree to recognise the outcome of another country's regulation as meeting their requirements for placing of products or services on their national market.

In each country this may be done by reference to an industry standard or standards, but that is a matter for each of the two sides to manage as they see fit. Under this approach, they do not need to recognise (by publishing in their own country) the private sector standards that are used by the other side to support their market structure.

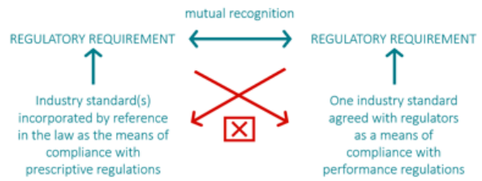
Mutual recognition of regulatory outcome does not require mutual recognition of industry standards, which (in this example) are self-evidently different anyway. The responsibility for meeting the regulatory requirement in each market rests unconditionally with the manufacturer or supplier, not on the regulator or standards maker.

This strategy should be explored for a post-Brexit world, encouraging a sharp focus on mutual recognition of the intent of a regulatory requirement between the UK and other countries, underpinned where appropriate by an international standard or other standard, if there is nothing available at ISO or IEC level.

Where regulations are supported in this way by an industry standard, then the first step on both sides is to agree that both countries will use international standards as a common platform or passport to trade. This is exactly how Kenya is trading with Europe, for example.

AN ALTERNATIVE APPROACH TO FTAs

Mutual recognition of regulatory requirement



Crash testing

Mutual recognition of regulatory outcome is already used in connection with conformity assessment procedures, which is the system by which manufacturers claim conformity with a given standard or regulatory requirement. It seems a nonsense, for example, that BMW cars should be crash tested in Europe and also in the US. In the end, it is the customer who will pay. Regulators can agree that the other side's regulatory objective in crash testing is acceptable. This does not require or need to imply recognition of the industry standard used for the testing.

Finally, it is important to note that seen from a top down perspective, market structures are complex and the use of standards and of technical regulations (which are effectively state-owned legally binding technical standards) varies widely across sectors.

The automobile industry, for example, is a highly regulated sector. Standards used for the safety of cars are primarily developed as regulations by UNECE, not by ISO or IEC, although there are many examples of supporting voluntary standards that address components or materials in car production.

Here again, it is vital that the value of industry standards is not lost in the argument over the equivalence of regulatory requirements.

We need to see standards as a tool for industry in their own right, recognising that standards have a high value to regulators as well and that it is in industry's interests to support this or face higher levels of regulation instead.

Let me now move onto my fourth and final chapter. Digitisation.

Chapter 04

Digitisation is not about technology, it's about trust

I commented earlier that the new frontier for business is no longer quality, it is trust. And in the world of digital products and services, privacy and security.

Just as the first generation of industry standards focused on technical specification, and the second generation addressed business process, over the last decade we have seen a new generation of standards emerge that address the principles and values of organisations, both as employers and as suppliers. Trust, governance, social responsibility and resilience is the mantra of today's successful corporations.

And then as if that were not enough, to be one of the leaders of the fourth industrial revolution we need a national strategy for new standards to support the tidal wave of the digital economy.

And this time, it is obvious that standards for the digital world must have global relevance and be widely adopted from the outset.

The digital revolution, or digitisation, should be an important part of any vision of how the UK can tackle the twin challenges of low productivity and regional disparity through Brexit and into the future.

At the World Economic Forum in 2013, digitisation was described as the mass adoption of connected digital services by consumers, enterprises and governments.

Digitisation has already swept through some industrial sectors (financial services, the media) and will inevitably revolutionise others (such as healthcare and construction). Consumers have already seen extraordinary benefits, from online bookings to social media and free communications.

The challenge is to convert this new value into GDP growth and continued employment.

There are risks too. The McKinsey report I referred to earlier describes the 'hollowing-out' of middle-skilled employment in developed countries, as more efficient production methods and automation replace production and administrative work.

Digital platforms including Amazon, Uber and AirBnB have challenged historic business models and brought new services to billions of people. The near zero cost of servicing new digital customers enables successful companies to grow at breath-taking pace, potentially achieving global scale in a matter of years.

The digital economy, underpinned by engineering and technology, will be transformational because of the revolution it brings in access to markets, both in the ability to reach and connect with customers and the ability of people to offer their labour.

DIGITISATION IS NOT ABOUT TECHNOLOGY, IT'S ABOUT TRUST

Adapted from: McKinsey Global Institute, Digital America: A tale of the Haves and the Have-Mores, December 2015

Evidence from the McKinsey report shows that 97% of the companies in France that sell online export, compared with just 15% of SMEs without an online presence. Enabling companies to exploit digitisation means that they can readily reach new markets.

The twin goals for any national economy should be to build confidence in the value of investment in automation and production efficiencies, in parallel with investment in online platforms aimed at new markets, innovative business models and connectivity with a widely distributed labour market.

Electronics and digital information are everywhere, but trust is the emerging limiting factor, embedded in the transactions between businesses, between government and their citizens, between industry and their customers, and of course between people themselves.

One way to build trust in the digital world is through consensus standards.

Not just the standards of interoperability or wiring of the internet, but standards that enable industry and their clients, governments and their citizens to take full advantage of the digital products and services being offered to them. They need:

01 To understand what commitments companies are making when they say how they will use the data provided to them,

02 To understand who owns the data in the product they are using, their car for example, or

03 How the data from their embedded medical device is relayed securely to a clinical expert, and (a familiar problem for all of us)

04 To offer informed consent.

This is the front line of standards for the digital economy. It's not about technology, it's about trust.

Research that BSI conducted in 2016 on the need for standards in Big Data found that the two areas most widely supported for standardisation by stakeholders were ensuring the integrity of contractual terms and conditions, and how organisations communicate to the wider world on their usage of data.

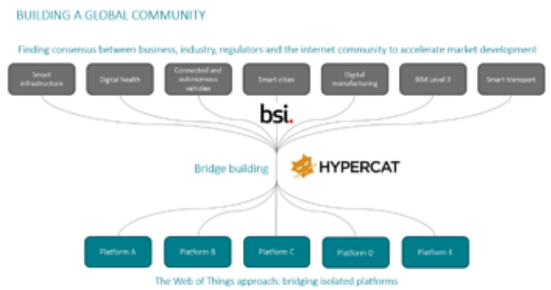
In the world of Information and Communications Technology (ICT) standards, alongside internationally focused standards organisations such as W3C and ETSI, there has been a plethora of small and niche participants working on standards facilitating the interoperability of hardware and software. Many of these are consortia, self-funded groupings of companies that come together to develop a technical specification, often in an open source environment.

When we look across the domain of the Internet of Things, the IOT, where physical objects are each individually connected to the internet and ask which players are active, the picture is overwhelming. This is just a sample, mapped by DKE. The same picture is common in many areas of emerging technology and ICT.

A MYRIAD OF STANDARDISATION BODIES IN THE INTERNET OF THINGS DOMAIN

Consortia have long had an important role in standards development, but there are drawbacks too. It is often unclear whether a consortium standard contains any Intellectual Property (IP), which may lead to lock-in for a user or require paying for a licence to effectively use the standard, and they may lack an independent governance process or the ability to demonstrate formal consensus. Equally, multiple, uncoordinated initiatives may lead to duplication of standards activities, incompatible standards or gaps in standardisation.

BSI has been working to bridge the gap between the consortia standards and the industry standards that facilitate market access for both buyer and supplier. Following the innovative work on BIM standards (that I described earlier) and Smart Cities and Infrastructure, we are working with the Hypercat Alliance to support new standards for the discoverability of components within the IOT. The first of these standards was the Hypercat Specification PAS 212, published last year.



The Hypercat programme was an Innovate UK sponsored initiative which BSI is now investing in aimed at building a vibrant global IOT membership community with a professionally managed subscription model developed in collaboration with its founders and members.

The intention is to facilitate a global alliance of collaborating cities, organisations and companies interested in the application of the IoT and the integration of interoperable and secure digital solutions across the domains of built environment, health, mobility and manufacturing.

We shall work closely with our colleagues in Germany at DKE and DIN to align Hypercat with the Industrie 4.0 standards now in development under German leadership.

Our research finds that SMEs often find it difficult to exploit the data they already have, and this is only going to get worse. It is important that UK manufacturing SMEs quickly improve their capacity and capability for exploiting data across their supply chains. Issues that need to be addressed for manufacturers include:

- the security of Intellectual Property (IP),
- how decisions should be made when using data from other companies,
- data security, reliability, and ownership, or simply
- how to trust data from a wide range of sources, some of which are automated.

We are bringing together cities from across the world to collaborate in pilot projects using PAS212, building on the achievements already made in Manchester (the City Verve project), Melbourne and through the Cities Standards Institute and its links with China.

BSI's latest research report on autonomous vehicles illustrates where consensus standards will be important to accelerate developments. Working with the Transport Systems Catapult, supported by the Centre for Connected and Autonomous Vehicles (CCAV), the research has focused on standards development that will address key issues with the new technology: public acceptance, the reliability of the existing infrastructure, integrating CAVs with existing transport systems, assessing their performance and the basic lack of common standards and consistent policy frameworks.

These examples demonstrate precisely the sort of collaborative, early stage work that is needed to support digital pioneers and entrepreneurs. But this should be the norm, not the exception. Standards should form a key theme underpinning the emerging UK Industrial Strategy, with experts focused on where standards can support strategic priorities such as Connected and Autonomous Vehicles, Smart Cities, Digital Health and so on.

Bringing UK thought leadership on the role of standards together with UK expertise in digital technology together with the user community will enable us to capture the key problem statements or use cases on which a strong consensus can be based. The outputs may be formal standards, technical specifications or simply guidance, but our goal should be to develop, as quickly as possible, a coherent and consistent set of knowledge for all to use.

It is what Lord Livingston once called 'soft power'.

In researching this talk I spoke a few weeks ago, to Jason Matusow, General Manager of International Standards at Microsoft Corporation. Here he is, explaining the importance of ISO and IEC for Microsoft.

Jason says that

The commonly-held perspective of ICT interoperability standardization (regarding the dynamics between consortia and formalized standardization) is rapidly becoming antiquated. The implications of open source collaboration mixed with the increased role of regulatory considerations is changing the landscape...

He firmly believes that

The ISO and IEC system is poised to have a significant impact on global commerce in the domain of pre- and post-regulatory technical rule-making. The unique position of ISO and IEC as universally trusted mechanisms for working on these challenges is important for governments, industry and consumers.

Conclusion

A passport to trade, a consensus of good practice, global advantage

In this new digital world, where the only barrier to your private life becoming a viral commodity is prudence, the concept of consensus standards has come of age.

The model that stakeholders themselves, everyone affected by an issue, should together agree what good practice looks like, is timely and effective. Standards are written by people, for people.

And of course, it can be open and dynamic. We are working on this today with new models for collaborative working and dynamic standards development. We want to retain the attributes I have described, of open public consultation, full stakeholder engagement and consensus, but we are confident that we can evolve our model to reflect the market needs. We call it agile standards development.

International standards of the type that I have described, that fill the catalogues of the UK national standards collection, contain no intellectual property (or where they do, it is carefully managed) and they can be (and are) easily reviewed and updated.

In the global economy, international standards provide a common shared platform, governed independently of vested interest, to which countries all over the world can contribute. It is very clear that one of the major opportunities arising from the Brexit vote has been a renewed interest across government, industry and consumers in this undervalued tool and how we may exploit our thought leadership in this space to national advantage.

Epilogue

Let me offer you one final story to bring these thoughts together. It's about Africa.

In Rwanda a few weeks ago, I caught up with Eve Gadzikwa, President of the African Regional Standards Organisation. Africa is starting the journey towards a Continental Free Trade Area, which aims to promote intra-regional African Trade. Standards play a key role within this development, with international standards the goal. Eve explained to me that at a continental level, they intend to have two tracks of standards development, the first for products that are exclusive to Africa, developed by regional Technical Committees. The second in response to stakeholder demand, where they will identify and adopt a suitable international standard before embarking on an African work item.

Here she is explaining how important the role of standards is to their future development:

> "We truly believe that it's time for Africa to participate in the global economy, and therefore international standards are critical for Africa. As you know, Africa is a growing continent, there are so many things that are happening, so we really look forward to ensuring that our companies, our SMES, all of this is coming together as we are growing Africa."

Close

I hope in this talk I have challenged some of the historic perceptions on the role of consensus standards and their supporting role to industry at international, European and national level.

I hope I've demonstrated that there is keen global interest in shaping the consensus knowledge for industry that forms a passport to trade and economic growth.

I hope we can continue the conversation. I and my team at BSI would be delighted to discuss how we can and should raise the awareness of the role of standards in the digital economy across the breadth of UK engineering and technology.

Our role in the National Standards Body is to ensure that the engineering profession and industry, consumers and government can make informed decisions on the role that standards might play in their strategy. Of course, it is their decision – industry, entrepreneurs, digital pioneers – whether and how standards could benefit their business. I'm just the messenger.

Thank you.

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