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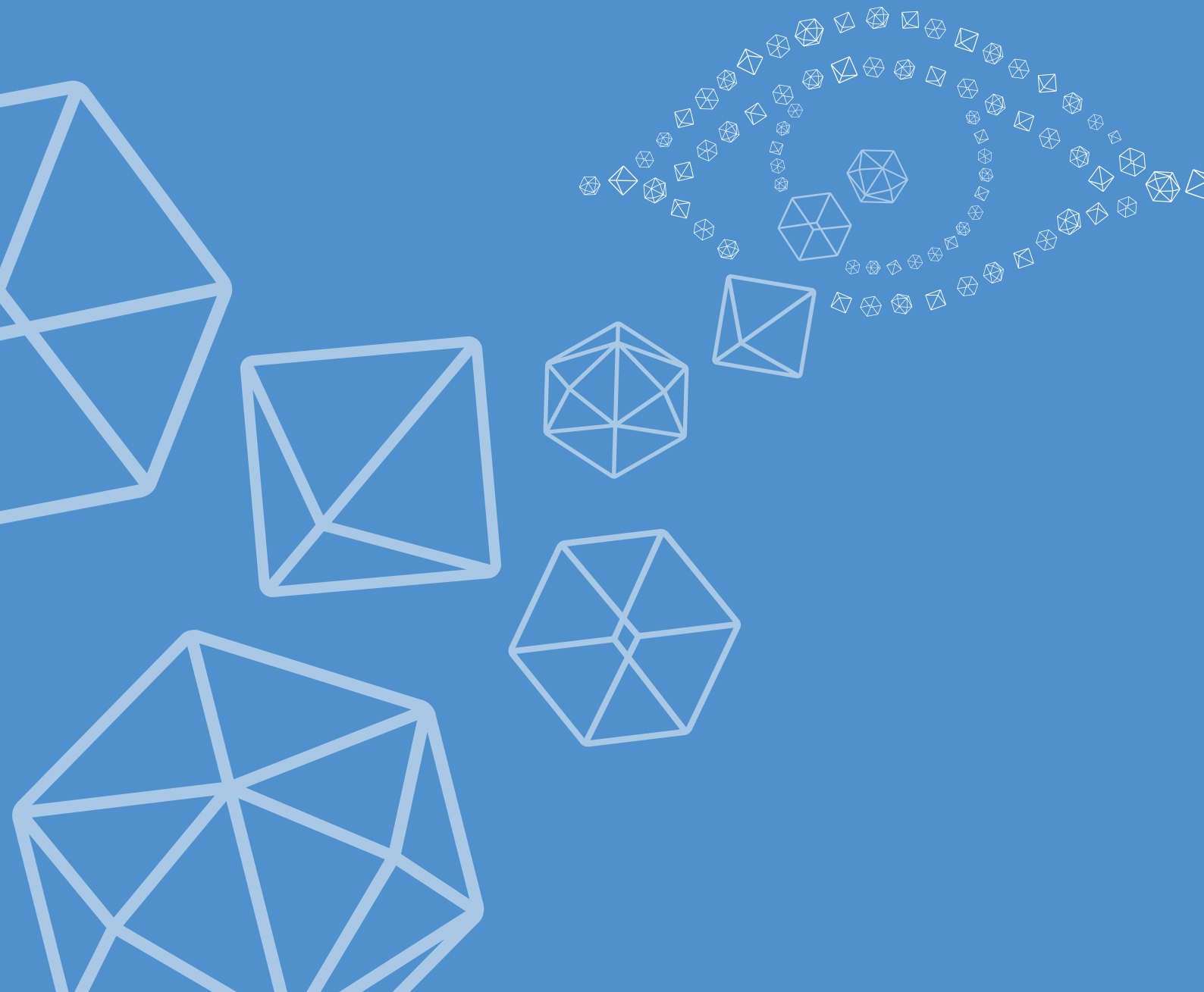
NESTA Making Innovation Flourish

Soft innovation

Towards a more complete picture of innovative change



Soft innovation

Towards a more complete picture of innovative change

Foreword

Over the past three years NESTA has published a series of reports documenting the extent of innovative activities in the UK that are 'hidden' from the traditional metrics used by policymakers. In this report, the economist Paul Stoneman uncovers a picture of rapid innovative change of an aesthetic nature – what he terms 'soft innovation'. Current policy, he argues, distorts the economy by supporting innovation of a technological and functional nature, and neglecting innovation of a soft kind.

In the creative industries, Professor Stoneman points to estimates suggesting very high and increasing rates of soft innovation: for example, about one-half of the titles in the UK Top 40 album chart change each month. And the bestselling video games now spend on average less than three weeks at the No. 1 position. Professor Stoneman argues that there are high – albeit less rapid – rates of aesthetic innovation outside the creative industries too, in sectors as wide-ranging as pharmaceuticals and foods.

Stoneman recognises the increased levels of support governments have given to the creative industries in recent years. But, provocatively, he argues for an 'overhaul' of innovation policy to recognise soft innovation activities both within and outside the creative industries. No doubt this thesis will have its critics as well as its supporters. As ever, NESTA looks forward to participating in the debate.

Hasan Bakhshi
Director, Creative Industries, NESTA

July, 2009

NESTA is the National Endowment for Science, Technology and the Arts.

Our aim is to transform the UK's capacity for innovation. We invest in early-stage companies, inform innovation policy and encourage a culture that helps innovation to flourish.

Executive summary

Nobel prize-winning economist Robert Solow in 1957 was the first to argue that the major determinant of changes in labour productivity in the US economy was technological progress. His conclusion has now been extended to many other countries and is widely accepted. As a result, a significant academic literature on innovation has developed, and there is a growing policy concern in most economies about how best to stimulate innovation in order to improve growth and economic well being.

Most previous studies of innovation have assumed innovation to be functional, scientific or technological. OECD manuals guiding the collection of data on innovation have largely reflected this perspective, with an emphasis on product and process (TPP) innovation in new goods and, more recently, services (although organisational and marketing innovation have also been identified). But while the emphasis on functionality has been economically valuable, it ignores a considerable body of innovation.

Soft innovation is a concept that reflects aesthetic changes

We define 'soft innovation' as a concept that reflects changes of an aesthetic nature. Such changes are considered significant if they are economically important. We show how important are new books, films, plays and video games in markets which exhibit regular novelty. Such innovations can also encompass a new line of clothing or the redesign of a car or a new advertising campaign. No-frills budget airlines or cosmetic surgery are further examples of markets in which firms rely on changes in aesthetics more than changes in technology to thrive or survive.

In short, we are concerned with changes in goods and services that primarily impact on sensory or intellectual perception and aesthetic appeal rather than functional performance. Soft innovation mainly concerns product innovation and, with that, product differentiation. Emphasising product differentiation allows that innovation may involve differences from the status quo and not just improvements, which is quite different from the standard approach where innovations in functionality require any new product to be an improvement; soft innovations may involve reductions in quality rather than just improvements (if price falls more than quality), as with budget airlines.

We identify two main types of soft innovation. The first involves changes in products in the creative industries, which are worth 6.4 per cent of UK gross value added, and include new books or movies. The second relates to aesthetic innovation in goods and services that are primarily functional in nature, such as new furniture or a new car model.

Soft innovation and technological innovation are interrelated

Although we distinguish between 'soft' and 'technological' innovation, we recognise that they are interrelated. Many improvements in aesthetic goods are the result of new technological products and processes – the iPod and other portable music players have changed the way we consume music, and have increased demand for downloads. Equally, demand for new products may be a result of aesthetic innovations: demand for DVD players is in part dependent on the quality of films available.

Traditional models of innovation tend to assume (often implicitly) that innovation must be vertical – all buyers will prefer the new product to the old at a given price because it is inherently better than the old product. But this ignores two other possibilities: horizontal innovation where some consumers may prefer the new and other consumers the old even when the new is priced similar to the old; and vertical innovation which doesn't involve an improvement in quality but may involve a lower

price. Soft innovation may include both the above possibilities.

Only soft innovations with high market share are considered significant
Many aesthetic innovations have little economic significance. In the absence of other measures, we use the market share for new aesthetic products – e.g. new books, films and video games – to assess their overall contribution. In general, the more units sold or the greater the market share gained by the new product, the greater its significance is considered to be. This differs from the approach in traditional guidelines, such as the *Oslo Manual*, which use increased functionality to judge which markets are important.

Non-traditional metrics are needed to measure soft innovation
Research and Development (R&D) and patenting activities are traditional measures of innovation. But they focus largely on the scientific and technological to the exclusion of the aesthetic. We need alternatives, if we are to gain a truer picture of the total extent of innovative activity in the economy.

By taking information from a number of sources we can get a consistent picture of the extent of soft innovation, despite problems with individual indicators. These include measures of innovation in the creative industries, taken from the Community Innovation Survey (CIS); core creative employment in the creative industries; creative employment in other industries; design activities in all industries; and copyright and trademark applications (although the latter also capture some TPP innovations).

CIS and design activity data suggest that soft innovation is extensive across the whole economy, and is particularly important in the non-manufacturing sectors. The survey data also suggest that the rate of innovation in the creative industries may be faster than in other sectors. The employment data suggest that seven times as many people are employed in activities encompassing both soft and TPP innovation in creative and other industries than are estimated to work in R&D, a common measure of innovative activity.

A useful measure of soft innovation is some indicator of the difference between the level of trademark activity and the level of R&D or patenting activity. This shows extensive and increasing soft innovations in most industries. Compared with the picture of innovation painted by TPP indicators alone, innovation appears to be more balanced across different economic sectors when soft innovation is included. Our analysis of registered trademarks and design rights suggests also that future macroeconomic research in this field should be broadened beyond traditional measures of innovation.

There are high rates of soft innovation in the creative industries
A study of the bestselling charts for books, music and video games reveals the extent of novelty among the top sellers that account for a substantial proportion of all sales. Book publishing is worth almost £2.8 billion to the UK economy with over 200,000 new titles each year; there are over 33,000 new music albums; and around 830 new video games are published each year worth £1.5 billion.

By looking at how long bestselling books spend in the charts, we show the importance of new titles (or product variants) to the market. The 205 books in the New York Times bestseller lists in one six-month period accounted for 84 per cent of all book sales. Sales of bestselling books usually peak early after launch and then gradually fall down the charts. A similar pattern is seen in the music charts, where about half of the titles in the UK Top 40 album chart change each month.

Innovation in video games is not just dependent on new titles, but also reflects console changes such as new versions of Playstation. There are fewer new games than books each year, but even among the top ten bestsellers between 1995 and 2007, only four spent longer than ten weeks at No 1.

Many new titles are launched in these industries each year, indicating high rates of soft innovation. Of the new products launched very few sell many copies. The most successful products sell in very large quantities though sales quickly decline with sales ranking. There is evidence – at least for books and video games – that product lifecycles are also becoming shorter and these markets exhibit greater and greater churn with more and more bestsellers each year. Taken together, the three industries studied reflect rates of innovation that are much greater than the rates of (labour) productivity growth of about 2.5 per cent per annum often quoted as a measure of the rate of TPP innovation in developed economies.

Soft innovation is significant outside the creative sector too
Outside the creative sector, there are many new product launches that do not reflect changed functionality. In the food industry, which is worth £54.6 billion a year in the UK, there is a big turnover in product lines and new ways of selling the same product. The industry also has to respond to changing consumer fashion, as the growth of Fair Trade and organic products has shown. Much innovation in this sector is not about new products or processes; it is soft innovation, catering to people's different tastes and aesthetic preferences rather than offering different functionality.

More interestingly, there is also significant soft innovation in pharmaceuticals, an industry thought to rely heavily on scientific advances. A study of launches of new generic pharmaceuticals (contentiously argued to be soft innovation) suggests that soft innovation activity may be the larger part of such activity in that industry. Only 10 per cent of all new products are considered wholly (functionally) new.

Missing soft innovation gives a biased account of total innovation activity
Taken together, these data tell a story of high and widespread rates of soft innovation. The failure of the traditional literature to take note of such innovation causes much innovative activity in the economy to be missed. This is not to argue that TPP innovation is not important, for it is, both in itself and as a basis for much soft innovation. It is however to argue that to concentrate solely on TPP innovation and to ignore soft innovation provides only a limited and biased account of total innovation.

Sub-optimal levels of soft innovation may justify some form of government intervention
Where there is too much or too little innovation, there may be a case for government intervention. However, although theory shows that there is no guarantee that free markets will produce the optimal level of innovation (indicated by extent of variety or adoption), whether there is too much or too little is open to dispute.

Two factors that we identify as important to innovation are rivalry – the impact of one person's ownership of a product on another's enjoyment of that product – and excludability – the ease with which a product owner or supplier can limit or control ownership by others. Such factors impact on the need for institutions to protect intellectual property rights.

Intellectual property rights are an important area for policy
Intellectual property rights (IPR) can be important in ensuring that innovators are not deterred by such factors. While patents have little relevance to soft innovation, other IPRs can be important.

- Copyright is relevant for soft innovation but can be costly and legally difficult to enforce, though it is usually granted automatically and is relatively long-lasting.

- Different types of design protection are available in the UK and Europe which protect against imitation and copying for a fixed period, but there is little evidence that they provide sufficient protection.

- Registered trademarks protect intellectual property; they enable the accumulation and storage of goodwill and brand awareness, and allow them to be used to sell products in other markets or at future dates.

The survey evidence suggests that businesses do not regard these formal mechanisms as their main means of protecting their intellectual property. In some circumstances they prefer non-institutional means, such as trade secrecy and lead times. However, in the absence of alternatives, the different mechanisms do offer varying degrees of protection for soft innovations.

The commercial benefits of soft innovation may be very high
Despite considerable evidence that the more traditional types of innovation matter to company profits and sales, there is as yet little evidence on the commercial importance of soft innovation. Returns to copyrights, trademarks and designs may partly reflect this impact, and suggest some positive payoffs to firms, but the evidence is limited.

The potential market impact of soft innovation can be illustrated using some high-profile examples, from budget airlines to cosmetic surgery. These show that soft innovations can be an important contributor to company performance and that they can generate significant returns. This positive payoff from soft innovation casts doubt on the validity of analyses that concentrate on traditional business innovation alone. By excluding or ignoring soft innovation, they incorrectly

attribute any benefits of soft innovation to changes in technological products and processes.

Government policy must embrace all innovative activities, not just technological or scientific

Given the potential benefits of soft innovation it is natural to consider whether government should or can speed up or extend such activity. However such stimulation is not socially desirable where markets produce optimal levels unaided or innovate too extensively. A key test for intervention must be whether the market will generate the welfare optimal outcome without intervention.

Alternatively, international comparisons of soft innovation performance may be used by governments as a basis for intervention. On some measures, the UK is not an international leader in soft innovation, though neither is it a major laggard. In any case, if policy is to be based on relatively poor international performance, it is important to understand why domestic performance is not good enough. Looking at responses to the CIS suggests some barriers to innovations and could support certain policy interventions, such as in improving skills, but the CIS has little specific information on soft innovation activities. Evidence on the potential effectiveness of such policies is also limited.

That all said, given the economic potential of soft innovation, there is logic in extending innovation policies such as tax incentives, government funding of innovation projects and public finance for innovation, as well as labour market intervention, stimulating market contestability and standard-setting to soft innovation. Policy should embrace all innovative activity and not just some of it.

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Part 1: Introduction

1.1 Purpose

This research explores innovation of an aesthetic nature

At its heart, this study is about innovation and the innovation process. While touching on aesthetics, creativity and the creative industries, its common point of interest is innovation. Our main argument is that there is a type of innovation, which we call "soft innovation", that is primarily concerned with changes of an aesthetic nature, and that this has largely been ignored in earlier studies of innovation. The existence of soft innovation means that not only is innovation more widespread than previously thought, but it may also take a different form.

Our approach is based in neoclassical economics: we assume that individuals behave rationally as buyers and sellers, and this provides a solid foundation for analysis. This is not in itself new. Richard Caves (2000) shows how economic incentives, uncertainty and contracts interact in the creative industries to explain why those industries are organised as they are and perform as they do:

> *"Economics can supply an understanding of why art worlds are organised the way they are. It draws on the logic of contracts (and their enforcement) and industrial organisation, supplemented by some propositions of how consumers behave in markets for creative goods. The explanatory power of this apparatus demonstrates that art worlds, while not all organized alike, all are ordered according to the same coherent process." (page 365)*

The idea of aesthetic innovation is not completely new to innovation research either (see for example Marzal and Esparza, 2007 and Tether, 2006 related to design) but we go further here by providing a detailed definition and a clarification of significant issues. In doing so, we contrast soft innovation with other types of innovation, exploring the connection with product differentiation and measuring the rate and extent of soft innovation in the UK. We apply standard tools of economic analysis previously used to analyse innovation to explore determinants, impacts and lessons for policy of soft innovation. The underpinning theoretical dimensions of this research are explored in greater detail in Stoneman (2010).

The starting point is Schumpeter's analysis of innovation

An obvious starting point is the definition of innovation. Schumpeter (1950) defined innovation as encompassing new products, processes, raw materials, management methods and markets. He characterised the technological change process as involving three stages – invention, innovation and diffusion. Although, for Schumpeter, innovation encompassed a single stage in the overall technological process, the term is now used widely to encompass all three stages and everything that the process involves.

For our purposes, innovation in a global sense occurs when new products, processes, raw materials or management methods are first introduced to an existing or new market. But given current discussions of hidden innovations (see NESTA, 2007), equivalently, innovation is taken also to occur when these inputs are first introduced to non-market institutions. Innovation may also occur in a local sense when a particular institution introduces the inputs in an existing or new market activity for

the first time, although others may have done so at an earlier date.

Prior to global or even local innovation, there will have been a process by which the new products or methods are brought to market. This process will encompass invention – the generation of new ideas – and probably also selection and development. This may involve advances in knowledge, basic and applied research, design activities or development expenditure. It will frequently concern the embodiment of new ideas into physical products. Not all new ideas will become innovations: many may be too expensive to develop, offer poor market prospects or be technologically unsuitable. However, every global innovation will require prior generation and development. Such activities might be labelled 'invention' but that seems too narrow. They might be thought of as R&D but, as will be shown, this is too technologically orientated. Instead, we call it "the innovation generating process", noting that innovation does not occur until the changes being generated come either to market or are used for the first time. Generating innovations thus involves much more than invention alone.

The third stage of the Schumpeter trilogy is diffusion – the process by which global innovations spread across their potential domestic and overseas markets (or across and within non-market institutions). The diffusion process is to some extent another way of characterising local innovations that follow global innovations.[1] Not all advances will become widespread. Over time, early innovations may be replaced by later innovations which in turn will be replaced themselves. The boundary of an innovation is not always obvious: the difference between a new and an improved product is rarely clear cut.

The key issues addressed in previous studies of innovation which offer a guide to the matters to be addressed here, have been (see for example, Stoneman, 1995):

1. The measurement of the rate and extent of innovation; the level of activity in the innovation generating process (including measures of inputs e.g. R&D spending, and outputs such as patents registered or scientific papers published); the extent and rate of diffusion of innovations; and the interpretation of different measures.
2. The determinants of the rate and direction of innovation and diffusion usually building on an assumption of profit seeking firms and rational consumer behaviour, encompassing such issues as why some firms/households/industries/countries experience faster or slower innovation and diffusion than others and the impact of market structure on the process.
3. The impacts of innovation and diffusion on outputs, productivity, employment, the performance of firms, trade and, more than anything else, on economic welfare.
4. Policy, considering whether there is a rationale for government intervention in innovation, innovation generating and diffusion processes and, if so, what instruments can be used in such intervention.

Existing innovation studies focus on technological or functional change

Much existing literature on innovation has taken a particularly technological/functional viewpoint at to what sort of new products and processes are to be considered innovations. This has ignored many innovative changes in products that are more aesthetic than functional in nature (such as products in the creative economy) as well as aesthetic changes to other products. To redress this imbalance, we use 'soft innovation' to encompass dynamic activities primarily involving aesthetic rather than functional change. Examples include the writing and publishing of a new book; the production and launch of a new film; the development and implementation of a new advertising campaign; the design and manufacture of a new range of furniture; and architectural activity in new buildings.

A focus on soft innovation relates to a number of related, but distinct, creative and knowledge economy concepts

Given the aesthetic basis of soft innovation, its analysis overlaps considerably with other similar topics. For example:

The arts

Soft innovation does encompass innovation in the arts (see Throsby, 2001, Ginsburg and Throsby, 2006) but it may also occur beyond the boundaries of the arts. Moreover, much study of the arts does not emphasise innovation dynamics.

1. To the extent that it is diffusion across institutions that is being discussed as opposed to diffusion within institutions.

The copyright industries
This term defines those sectors that rely most on copyright as a means to enforce intellectual property rights (see Gantchev, 2004, and Theeuwes, 2004). Copyright may be important for soft innovation, but can be equally important to computer programmes, databases and maps. Soft innovations may also be important beyond the copyright industries.

Design
Design is closely related to soft innovation, but has narrower coverage (Tether, 2006): design would not encompass new books, music or theatre, whereas soft innovation does.

Creativity
Creativity is the generation of new ideas, wherever this happens, and relates closely to our topic (Howkins, 2001). But soft innovation also involves the turning of those ideas into marketable products. Moreover, creativity is involved in other types of innovation too and is thus not unique to soft innovation. For a discussion of the link between creativity, design and innovation see DTI (2005) and Cox Review (2005).

The creative industries
These industries are defined more precisely in the next Part, but this term is used by policymakers to encompass the commercial arts and media sectors (see, for example, DCMS (2009)). Again, soft innovation impacts beyond the boundaries of these industries.

The knowledge economy
This term is designed to capture the increasing role that knowledge, rather than objects, play in the world economy.[2] An increasing role for soft innovation may be part of this changing picture but is neither the same nor a major part of the focus of the knowledge economy literature (the research of The Work Foundation is an exception[3]).

Intangible investments
Recent discussions of the knowledge economy have centred on measurement issues relating to intangible capital (e.g. Haskel, 2007). This literature emphasises the increasing role of intangible assets in the economy and the difficulties with their measurement (see HM Treasury, 2007). The focus of this literature has been in exploring the implications of measuring intangible investments for GDP and the national accounts, although Clayton, Dal Borgo and Haskel (2008) discuss its implications for innovation.

In sum, despite obvious parallels, the study of soft innovation carves out a niche that differs from the traditional analysis of innovation in economics and also from the above areas.

1.2 Report outline

This report starts with attempts to define and measure the extent and nature of soft innovation. Part 2 introduces the issues and provides a fuller conceptual argument as to why soft innovation is important. Part 3 takes a macro view and attempts to map the extent of such innovation in the economy as a whole. Part 4 is the first of two taking a micro view encompassing three creative industries – publishing, music and video games – to detail the pattern of invention and creation, as well as the embodiment and diffusion of soft innovations. Of particular interest are product variant launch patterns, the lifetime of product variants and how other types of innovation interact with soft innovation. Part 5 explores the role of soft innovation in two non-creative industries, food and pharmaceuticals. The emphasis is naturally on the UK, but examples from other countries are also used.

Following a theoretical reprise in Part 6, Part 7 explores the role of intellectual property rights in the process of soft innovation and the extent to which standard analysis is appropriate and can provide insight or requires modification. Part 8 is concerned with impacts of soft innovation on the performance of firms, Part 9 considers policy implications, and the concluding Part 10 summarises, draws implications and gives indications of fruitful future research directions.

2. See Danny Quah's website: www.econ.lse.ac.uk/~dquah/tweirl0.html
3. See http://www.theworkfoundation.com/research/keconomy.aspx

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Part 2: Defining soft innovation

2.1 Introduction

In this Part, we look at the concept of soft innovation, exploring its nature and how it differs from other types of innovation. We also discuss its significance and consider its measurement and prevalence. We suggest that soft innovation has two main forms and explore how to judge their significance. Soft innovation is also shown to be related to product differentiation, and we consider the relationship of soft innovation to research and development (R&D) and patenting.

2.2 Product and process innovations

The OECD's *Oslo Manual* is the yardstick by which innovation is measured

The definition of innovation provided by Schumpeter (1950) encompasses new products, processes, raw materials, management methods and markets. A series of editions of the *Oslo Manual*, produced by the OECD (the first in 1992, the latest being OECD, 2006), have provided the yardstick by which statisticians, economists and policymakers in most OECD countries have measured innovation and innovative activity. Together with the *Frascati Manual*, OECD (2002), which measures R&D activity, their guidelines have provided the basis for national innovation surveys and international comparisons of R&D. One of our main arguments is that, despite recent extensions, the Oslo and Frascati definitions do not sufficiently cover soft innovation activities. As a result, they give a distorted picture of overall innovative activity in the economy.

The *Oslo Manual* has over time gradually encompassed a wider definition of innovation

The *Oslo Manual* initially concentrated on technological product and process innovation (TPP) in goods, later expanding to cover services (see, for example, Tether, 2003) and organisational innovation. The 2006 edition also covered marketing innovation separately. Though the OECD dropped the technological label in 2006, we continue to label product and process innovations as defined by OECD (2006) as TPP innovations for ease of reference.[4] The 2006 Manual now describes innovation as:

> *An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (p.46).*

Definitions of significant product or process innovations stress novelty and improvements in functional performance

The definition of product innovation provided in Chapter 3 of OECD (2006) is:

> *A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics (p.48).*

Product innovations include both the introduction of new goods and services and significant improvements in existing goods and services. New products differ significantly from products previously produced by the

4. Organisational innovation in a firm (the implementation of a new organisational method in business practices, workplace organisation or external relations) does not form part of this study and is thus discussed no further.

firm. The development of a new use for a product with only minor changes to its technical specifications may also be a product innovation. Significant improvements to existing products can occur through changes in materials, components and other characteristics that enhance performance.

Product innovations in services can include significant improvements in their efficiency or speed, the addition of new functions or characteristics, or the introduction of entirely new services. Although design is an integral part of the development and implementation of product innovations, design changes that do not involve significant change in a product's functional characteristics or intended uses are not regarded as product innovations. Thus to be labelled a product innovation, by these definitions, any change must involve either novelty or significance in their impact on the product's functional or performance characteristics.

Process innovation is defined by the OECD (2006) as:

> *A process innovation is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software (p.49).*

Process innovations can be intended to decrease unit production or delivery costs, to increase quality or to produce or deliver new or significantly improved products. They include new or significantly improved methods for creating or providing services, and can involve significant changes in the equipment and software used in services-oriented firms or in the procedures or techniques used to deliver services. Again, for a change to be considered an innovation, it must involve novelty or a significant change in impact on the functional or performance characteristics of the process.

According to the Community Innovation Survey, around one-fifth to one-third of firms in the UK engage in TPP innovations

Table 1 uses data from the fourth UK Community Innovation Survey (CIS) to provide some indications of the frequency of TPP innovation. This illustrates the extent to which firms undertake these different types of innovation. Sourced from Battisti and Stoneman (2007), the table shows around 20 per cent of the 16,383 surveyed firms introduced product and 30 per cent process innovations in the 2002-2004 period.

But the CIS is silent on a range of other innovation activities

Despite the apparent widespread nature of product and process innovation, many innovative activities in the economy are not covered by the OECD definitions. These include

1. The writing and publishing of a new book
2. The development and recording of a new CD
3. The writing, rehearsing and staging of a new theatre production
4. The writing, production and launching of a new film
5. The development and launch of a new advertising promotion
6. The development and launch of a new clothing line

Table 1: TPP and organisational innovations, sample adoption (percentage), UK, 2002-2004

Type of innovation	Definition	Percentage of adopting firms
Product Innovation	Whether a product innovation (new to the enterprise or to the market or a significantly improved good or service) has been introduced on the market between 2002 and 2004.	20%
Process Innovation	Whether a process innovation (new to the enterprise or to the market that significantly improved methods for the production or supply of goods and services) has been introduced between 2002 and 2004.	29%

Source: Battisti and Stoneman (2007)

7. The development and launch of some new financial instruments

8. The design and production of a new range of furniture

9. Architectural activity in the generation of new built form designs

10. Design activities relating to motor vehicles

Although such changes involve novelty – a basic requirement of innovation – they are ruled out of the OECD's definition of innovation because they do not involve functional change.

But innovations involving change that is not functional in nature should be included

The world economy has undergone major structural changes in recent years. The emergence of Information Technology and the comparative decline of agriculture and manufacturing employment in the developed world, has seen new descriptors for the resulting economic structures including the 'Service Economy', 'Information Economy', 'Knowledge Economy' and the 'Weightless Economy'. Each term reflects the greater importance of the trading of knowledge and information as opposed to 'things'. So, to ignore certain changes because they are not functional in the traditional sense may be to ignore an increasingly important part of innovative activity.

For example, it can be as expensive to create a new film or piece of music as a new drug – new movies often can cost more than $200 million to produce. They involve activities similar to the R&D process in the pharmaceutical industry – creative thought, experimentation, selection, testing, and market appraisal. Yet, drug development is considered innovation by the OECD while film development is not. The same is true in the fashion industry: the bi-annual round of fashion shows, restocking of shops and changing of buyers' apparel may be even more innovative than traditional technological product and process innovation. Clearly a new approach is required.

2.3 Soft innovation: the definition

We have seen that the OECD's definitions of TPP innovation emphasise functional change. The soft innovation concept argues instead that these definitions exclude a major source of change in modern economies.[5]

Several researchers have already stressed the importance of non-functional innovations

Bianchi and Bartolotti (1996) draw attention to what they label "formal" innovation *"which is innovation that changes product form without any necessary changes in product functions and production methods"*. They consider that the new form "exalts the aesthetic or symbolic content of the product". They associate such innovation with fashion and design goods in particular. Cappetta *et al.*(2006) talk of "stylistic innovation" – the change in the aesthetic and symbolic elements of products and services, applying the approach to a longitudinal empirical study (1984–2002) in the fashion industry.

Postrel (2004) has taken this argument much further and draws implications beyond fashion and design goods. She argues that aesthetics are of increasing importance in society in that people are more and more concerned not only with function but also with how things look and feel. Examples of aesthetic changes include clothing, cars, makeup, plastic surgery, hairstyles, restaurants and graphic design.

Swan *et al.*(2005) corroborate the importance of aesthetics in product demand. They show how businesses recognise the importance of visual or aesthetic design in consumer choice. For example, in the automobile industry, an important aspect of body design is how light reflects off a car's surface; and the aesthetics of luxury automobiles are critical to their consumer appeal. They also show how product aesthetics can affect product evaluation: portraying a quality image influences consumers' evaluation of products, even if the appearance has no bearing on the functional performance of the product. In a related way, Hagtvedt and Patrick (2008) specifically address the issue of how visual art has a favourable influence on the evaluation of consumer products.

Marzal and Esparza (2007) argue that some industries experience aesthetic innovations when new visual (or sensory[6]) attributes are conferred on a product. As a result of aesthetic innovation, a product is seen as radically different to earlier products which it seeks to displace. These authors consider that the key characteristics of aesthetic innovation are that it: increases the perceived value of the product and satisfies customer demands concerning

5. An alternative definition of innovation to that in the Oslo Manual has been adopted by policymakers in the UK in recent years, namely that innovation is the "successful exploitation of new ideas" (DTI, 2003). Put in this way, there is no reason why the product of exploiting new ideas should be restricted to functional improvements and thereby exclude aesthetic changes. In other words, innovation is about improving economic wellbeing by the use of new knowledge, and new knowledge is not just reflected in functionality.

6. For example smell. See Morrin and Ratneshwar (2000).

taste, social image and preference for novelty; does not provide new functionality to the product; does not alter the way a product is used; but may make use of new technologies or materials. They also draw analogies with other labels proposed for what they call aesthetic innovation, including design innovation and stylistic innovation. The key distinguishing characteristic is once again the contrast between the aesthetic and the functional.[7]

We propose a new definition which encompasses these non-functional innovations

Since we do not feel that any existing definition captures all these non-functional innovations adequately, we introduce the concept of soft innovation. The definition of soft innovation captures both those goods offering aesthetic rather than functional appeal as well as those goods and services with a distinctly intellectual appeal (including books, art or computer games). We offer this definition:

> *Soft innovation is innovation in goods and services that primarily impacts upon sensory perception, aesthetic appeal or intellectual appeal rather than functional performance.*

By aesthetic we encompass issues wider than visual beauty or artistic experience. The Online Etymology Dictionary draws on Immanuel Kant to define the term in its original classically correct sense as "the science which treats of the conditions of sensuous perception." Although today 'sensory' is a more appropriate word than 'sensuous', we embrace this definition. Aesthetic not only involves sight but also touch, smell, and sound.

This soft innovation may occur in any industrial sector or market. Most soft innovation will involve new products or services. Although new processes (or production methods) that have different aesthetics are not ruled out (some green wind energy technologies have undesirable noise effects and are not visually appealing), our focus is primarily on new products.

Demand for soft innovations may arise from households or businesses

These new products may be targeted at households, businesses or even governments at home and abroad. Business demands for new products and processes arguably differ in their nature from consumer demand, in that business demand may be less concerned with aesthetics. However, a look at the architecture of office blocks in the world's major cities suggests that this is not always the case.

2.4 The two faces of soft innovation

The first type of soft innovation is innovation in products that are aesthetic or intellectual in nature

It is useful to distinguish between two main types of soft innovation. The first is innovation in products that are not generally considered functional in nature but instead offer aesthetic or intellectual appeal. The introduction of any new such product is taken to be a soft innovation. Examples are music, books, film, fashion, art and video games. Such products are to be found particularly in those industries that it has become practice to label the "creative industries,"[8] a sector shown to be of considerable size (see for example, DCMS, 2009, Andari *et al.* 2007). DCMS estimates that in 2006 the UK creative industries accounted for 6.4 per cent of Gross Value Added (GVA) having grown by an average in real terms of 4.1 per cent per annum between 1997 and 2006, compared with an average of 3 per cent for the whole of the economy over this period. UK exports of creative services totalled £13 billion in 2006 representing 4.3 per cent of all services exported.

It would clearly be inadequate to apply a concept of innovation based on functionality alone to innovation in such industries. In most past economic analyses of innovation, these industries and their products have been ignored as a result.[9] Thus, despite considerable revenue from J K Rowling's Harry Potter books and resulting films, her work has not generally been considered by economists to be an innovation.

The second type of soft innovation is aesthetic innovation in goods and services that are primarily functional in nature

The second type of soft innovation is aesthetic innovation in functional industries.[10] Although there are some studies on product innovations relevant to such markets (see Trajtenberg, 1990), it is only recently that the aesthetic aspects of such functional products have been considered (e.g. Tether, 2006, DTI, 2005 and Cox Review, 2005).

Yet products in such industries may have many non-functional characteristics. These may encompass the basic senses – for example, the appearance of furniture, the sound of a

7. They also argue that the definition of aesthetic innovation should exclude minimal changes which do not substantially alter the product image, because the magnitude of the change should also take into consideration the economic efforts and results (a change of colour, for instance) involved. According to this definition, an aesthetic change would be considered innovative if it makes the product be perceived as new or different. These changes must entail substantial modifications to the product's formal structure; thus changing the colour of the product or its ornamentation would not constitute an innovation, but would be classified as "other aesthetic changes".
8. An unfortunate implication of this term is that all other industries are 'not creative' which is clearly not the case.
9. In the marketing literature, Venkatesh and Meamber (2006) look at cultural production and the creation, diffusion, and consumption of cultural products. They address: the nature of cultural production, including the roles that producers, cultural intermediaries and consumers play in the process; emerging perspectives and ideas on cultural production; aesthetics and art in cultural production; new epistemologies concerning postmodernism and posthumanism as related to cultural production; and the implications of the cultural production processes for the marketing aspects of cultural industries.
10. Bakhshi *et al.* (2008) details links in innovation between the creative and 'non-creative' sectors.

car exhaust, the taste of a meal, the smell of flowers in a garden design or the touch of a sheepskin rug. Many new products of this kind will of course offer both soft and functional innovations, for example a new model of car will offer better miles per gallon, top speed, fuel consumption as well as new colours, shape and sounds. Businesses of course recognise this: Higgs *et al.* (2008) estimate that large numbers of creative professionals are employed in businesses outside the traditional creative industries.

The *Oslo Manual*'s concept of marketing innovation brings at least some soft innovations into the innovation metrics

Although the OECD's definitions of innovation largely exclude soft innovation in the 'creative industries', their definition of "marketing innovation" overlaps with soft innovation in other industries. Specifically, marketing innovation is defined by the Oslo Manual as:

> *A marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing (p.49).*

The manual explains that marketing innovations aim to increase a firm's sales by better addressing customer needs, opening up new markets or newly positioning a firm's product on the market. A new marketing method is distinguished by not being previously used by the firm, and must be part of a new marketing concept or strategy that represents a significant departure from the firm's existing approach. New marketing methods can be implemented for both new and existing products.

"Significant changes in product design"[11] refer to changes in product form and appearance that do not alter the product's functional or user characteristics. These also include changes in the packaging of products such as foods, beverages and detergents, where packaging is the main determinant of the product's appearance. An example is provided by the manual:

> *As an example, clothes produced using new fabrics with improved performance (breathable, waterproof, etc.) are product innovations, but the first introduction of a new shape for clothes intended for a new group of customers or to give the product a higher degree of exclusivity (and thus allow for a higher mark-up compared to the previous version of the product), is a marketing innovation. (p56)*

Innovations in product design can also involve significant changes in the form, appearance or taste of food or beverage products, such as new flavours for a food product aimed at attracting a new type of customer. Changes in "product placement" primarily involve new sales channels, such as franchising, direct selling, exclusive retailing or product licensing.

Innovations in "product promotion" involve new concepts for publicising a firm's goods and services. For example, the first use of a new media outlet or technique – such as product placement in television programmes, celebrity endorsements or a new brand identity – is a marketing innovation.

Innovations in "pricing" involve the use of new pricing strategies to market the firm's goods or services, but new pricing methods whose sole purpose is to differentiate prices by customer segments are not considered innovations.

The *Oslo Manual* is clear that the basis for distinguishing a marketing innovation from a product innovation is functionality. By introducing the concept of marketing innovation, the OECD has brought at least one component of soft innovation into mainstream innovation metrics. However, in not recognising as innovations new products in industries where the output is inherently aesthetic, for example, it still misses a significant part of soft innovation.

Even so, the line between a functional and a soft innovation is not clear cut. For example, with a personal service, is a more pleasant transaction a functional innovation or an improved aesthetic dimension to the trade? This problem is especially severe where the product is considered functional rather than aesthetic – in contrast, marketing innovation leads one naturally to consider that the distinctive but intangible quality encompassed by the concept of brand image[12] is an aspect of product aesthetics.

Soft innovation does not occur in isolation

Despite our attempt to differentiate soft innovation from TPP innovation, the two types of innovation are not independent of each other. In particular,

- Many improvements in aesthetics are enabled or made cheaper and more effective by advances in technological products and processes.

11. Although design is an integral part of the development and implementation of product innovations, design changes that are not seen as involving a significant change in a product's functional characteristics or intended uses are considered by the manual not to be product innovations. However, they can be marketing innovations. Routine upgrades or regular seasonal changes to products are also not product innovations.
12. Defined by the American Marketing association as: "the perception of a brand in the minds of persons. The brand image is a mirror reflection (though perhaps inaccurate) of the brand personality or product being. It is what people believe about a brand – their thoughts, feelings, expectations." See www.marketingpower.com/mg-dictionary-view339.php). See also Bennett (ed.) (1995).

- There may be demand-side interactions between soft and functional innovation. For example, the demand for DVD players is in part dependent on the quality of films available, as is the demand for MP3 players on the quality of music.

2.5. Soft innovation and product differentiation

Few previous studies of technological innovation have considered product differentiation

There has on the whole been only limited interaction between the concepts of product differentiation and innovation in the economics literature on technological change. Product differentiation activities have generally not been considered as innovative activities, although, some innovative products have been differentiated from existing products (for example, see Greenstein and Ramey, 1998) and some US-based work emphasises product differentiation (see, for example, Bresnahan and Gordon, 1997). Much soft innovation however involves product differentiation.[13]

Product variants are said to be differentiated when two or more goods or services are essentially or generically the same, but can be individually identified, through either their performance or aesthetic appeal, and are preferred differently by and between consumers on the grounds of those consumers' tastes or preferences (Tirole, 1988). Thus, cars are differentiated by design, colour, size, speed, power, or whether they are hardtop or soft-top. Recorded music offers many different albums, and there are many different book titles on the market. Clothes, furniture, food, restaurants, financial instruments and insurance policies all differ from each other. In fact differentiated products are the norm.

There are two broad categories of product differentiation – vertical and horizontal

There are two recognised types of product differentiation in the literature – vertical and horizontal (Tirole, 1988).

Two product variants are considered "vertically differentiated" if all buyers prefer one to the other at a given price. In this case, the two goods can be objectively ranked in terms of quality. A classic example is first class versus second class rail travel.

Two product variants are considered "horizontally differentiated" if one is preferred by some consumers and the other is preferred by others, at a given price. In this case the variants cannot be ranked objectively in terms of quality but only subjectively. An example is milk chocolate versus plain chocolate.

Note that although a newly introduced vertically differentiated product variant can be judged as superior or inferior to existing products, this is not possible with a new horizontally differentiated product variant which may be judged better by some and worse by others. Thus once product differentiation is allowed, a new variant will be a different variant but not necessarily an improved one, and there will be no necessary correspondence between innovation (new product variants) and "improvement".

The *Oslo Manual* rules out horizontal product differentiation as innovation

The *Oslo Manual* definitions of innovation implicitly assume that a new product variant must be vertically differentiated from other products if it is to be considered a product innovation.[14] Any new vertical product variant must be a functional improvement, ignoring new lower quality vertically differentiated products. There is no allowance for new horizontally differentiated product variants as innovation either. In the 1997 edition of the *Oslo Manual*, new models of complex products, where changes are technologically "minor", are regarded as product differentiation and ruled out as innovation.

We argue instead that: (i) horizontal product differentiation (which may improve economic welfare for some or all by offering more desired products and more variety, see for example, Dixit and Stiglitz, 1977, and Brynjolfsson *et al.*, 2003) is also innovation; and (ii) a vertical innovation need not show performance improvement.[15] Thus, not only should aesthetic changes be considered as innovations but those changes may be horizontal or vertical and, if they are vertical, they may even offer lower quality.

2.6. Judging the relative significance of soft innovation

Many new aesthetic and non-aesthetic products, processes and marketing methods are introduced to an economy over time. But not all such changes are significant.

13. In order to clarify discussion, and throughout this report, the term 'product' is used to define the goods/services being purchased e.g. books, CDs, computer games, painkillers, chocolate bars, etc. Particular embodiments, e.g. pre-recorded DVDs of films of Harry Potter and Ben Hur, will be considered to be product variants. Different media are taken to encompass similar content embodied in different products, e.g. one may acquire a recording of the opera Aida on vinyl, cassette, CD, DVD, or MP3. Hardware and software are defined so as to encompass respectively equipment and content.
14. However it does not necessarily follow that a new vertically differentiated product has to be a TPP innovation. This would only be so if the vertical differentiation arose from technological performance characteristics whereas it may also arise from aesthetic characteristics.
15. A vertical innovation that does not show performance improvement may still be a market success if it is cheaper.

The various *Oslo Manuals* have quite rightly offered guidelines as to how significance is to be judged. The most common approach is to measure inputs and outputs. The former reflect whether the innovation differs considerably from what was previously available while the latter reflect whether the innovation has had a significant impact.

Our preferred criterion for evaluating significant innovations is impact on economic welfare

Economists ultimately evaluate change on the basis of its impact on economic welfare (at the date of innovation or later). That is also our preferred criterion of significance.

The impact of new products on welfare has recently[16] received some theoretical and empirical attention in US economics literature (Bresnahan and Gordon, 1997, Nevo, 2001, Hausman and Leonard, 2002). Petrin (2002) estimates the change in welfare arising from the introduction of the mini-van (or people carrier). He estimates that this generated large welfare gains for both consumers (calculated as $2.8 billion in 1982-4 prices over the five years 1984–1988 inclusive) and a surplus for the producers of mini-vans (of $105 million), which were partly offset by the loss in business for producers of other vehicles. Other studies focus on buyer benefits from new products in traditional markets covering a range of goods, including: automobiles (Feenstra, 1988; Berry, Levinson, and Pakes, 1993); computers (Bresnahan, 1986; Greenstein 1994; Brynjolfsson, 1995; Prince, 2007); health care services (Trajtenberg, 1989); breakfast cereals (Hausman, 1997); and cable television (Goolsbee and Petrin, 2001). There appear to have been no attempts to apply these techniques to soft innovations in particular.

In the absence of actual estimates of the welfare impacts of soft innovations, we proxy the welfare impact of soft innovation using the sales or market share realised by a new product or product variant. In general, the more units sold or the greater the market share gained by the new product, the greater its significance. We call this the 'market impact criterion.'[17] Market success is seen as a rough proxy for welfare generated by the product when welfare is calculated as the sum of producer and consumer surplus[18] – or the profit plus the extra perceived value to buyers of the new product.

The market impact test of significance is implemented here by considering the market share of products which are in the bestseller lists, in markets where the overall number of products available can top these numbers hundreds or even thousands of times over. However, such a test necessarily places little weight on innovations in the so-called long-tail of the sales distribution (Anderson, 2006).

A number of studies have shown that recent changes in technology such as digitisation[19] have enabled suppliers such as the internet store Amazon to stock a wider selection of titles more cheaply, with the result that sales of titles of limited popularity now persist for longer periods of time. Collectively – it is argued – these titles command a larger market share than was the case previously. Brynjolfsson *et al.*(2003) quantifies the impact that the increased variety of books available online has had on consumer welfare. Brynjolfsson *et al.*(2007) argues that many markets such as books have traditionally exhibited an 80/20 rule – that is, the top selling 20 per cent of products represent 80 per cent of sales. By analysing data from a multi-channel retailing company, they present empirical evidence that for distribution online, this rule needs to be modified to a 72/28 split in order to fit the distribution of product sales in that channel. Although an important change compared with traditional distribution channels, this result does not appear to have implications for our market impact measures of significant innovations.

The *Oslo Manual* employs user functionality to decide which innovations are significant

The *Oslo Manual* uses a very different approach to judge the significance of product and process innovations. It looks at which innovations have brought significant changes in functionality, relating for example to "technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics".

In other words: the greater the functional advance, the more significant the innovation. But this metric cannot be employed for soft innovation, where the advances are aesthetic or intellectual rather than functional. Of course, TPP innovation could alternatively be judged by its market impact, and what is functionally significant may not pass the market impact test. Concorde was functionally significant as an aircraft, but had an insignificant market impact. Likewise, a major new product in an insignificant sector may have limited market impact whereas a minor functional advance in a large sector may have a considerable impact.

16. Although the Social Savings approach, which is very similar, goes back further, e.g. White (1976).
17. The market impact test has the further benefit of indicating as of most significance those innovations that are most widely diffused in the market with the extent of the market impact being spread over time in accordance with the diffusion pattern. This neatly ties together the second and third stages of Schumpeter's trilogy.
18. Consumer surplus is a measure of the extent to which buyers of a product consider that product to have value greater than the price paid, which one may assume increases with sales, whereas producer surplus is a measure of the profits earned on the product which may also be assumed to increase with total sales.
19. Brynjolfsson *et al.* (2006) identify how on the supply side e-tailers' large and centralized warehousing allows for more offerings, while on the demand side, search engines and sampling tools are allowing customers to find products outside their normal area.

Other alternatives include peer-based measures of advances in knowledge

Other alternative views of significance may also be employed, such as the contribution to knowledge that an advance makes. Peer review and citations are used in science to judge the significance of a new study. But scientific significance does not necessarily bring market significance, as can be seen with advances in astronomy. In principle, just as one scientific advance may be judged more significant than another, so one aesthetic advance may be more artistically significant than another – some might say Elvis was more significant than the Beatles or Van Gogh was more significant than Andy Warhol.

To overcome this problem, it may be possible to devise internal metrics, such as influence on others, number of imitators, or the extent of copying (see for example Galenson, 2005). But internal metrics for judging artistic significance are by their nature less robust than their scientific counterparts. In fact some commentators, such as Carey (2005) go as far as to argue that there are no absolute criteria of value, and there are no independent canons of taste, in the arts.

2.7 Research and Development

R&D is a key innovation metric used by policymakers

International standards for the measurement of research and development were first put forward 40 years ago in the Frascati Manual. The third and latest edition OECD (2002), deals exclusively with the measurement of human and financial resources devoted to research and experimental development (R&D). The formal definition of R&D is as follows

> *Research and experimental development comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications (page 30).*

This definition covers both science and technology, encompassing basic research, applied research and experimental development. By including the phrase "knowledge of man, culture and society" it also includes the humanities and social sciences.

But it excludes a number of innovation activities by definition

However, it still excludes a number of innovation activities.[20] In particular the manual states it excludes:

> *All those scientific, technical, commercial and financial steps, other than R&D, necessary for the implementation of new or improved products or services and the commercial use of new or improved processes. These include acquisition of technology (embodied and disembodied), tooling up and industrial engineering, industrial design n.e.c., other capital acquisition, production start-up and marketing for new and improved products (page 33).*

> *The basic criterion for distinguishing R&D from related activities is the presence in R&D of an appreciable element of novelty and the resolution of scientific and/or technological uncertainty, i.e. when the solution to a problem is not readily apparent to someone familiar with the basic stock of common knowledge and techniques for the area concerned. (page 34).*

Importantly, these definitions require that R&D involves "the resolution of scientific and/or technological uncertainty". Thus expenditure on activities not devoted to either science (including the arts and the social sciences) or to technological product and process innovation (thereby excluding marketing innovations and organisational innovation) is not counted as R&D expenditure. Thus expenditure on purely aesthetic activities, which we have called aesthetic innovation, is not defined as R&D. As a result, R&D data seriously underestimate total innovative activity in the economy.

2.8 Patenting

Patenting activity is also a flawed measure of innovative activities

Patenting is used by inventors to protect their intellectual property rights for a proscribed period of time. Frequently the extent of TPP innovations is measured by the level of patenting activity, with data on the payment of renewal fees sometimes added as an indicator of quality.

20. Although even now there is still discussion of how R&D should be defined and measured. A recent aspect of this discussion relating to the intangible aspect of R&D can be found in Galindo-Rueda (2007). The Bureau of Economic Analysis (BEA) and the National Science Foundation (NSF) argue that Gross Domestic Product (GDP) would be nearly 3 per cent higher each year between 1959 and 2004 – $284 billion higher in 2004 – if research and development spending were treated as investment in the U.S. national income and product accounts (National Science Foundation, 2007).

In the UK, only advances of an industrial nature can be patented (this may not even encompass all of TPP activity). Aesthetic improvements leading to soft innovations cannot (although there are other forms of IPR protection for soft innovation, which are considered in later chapters). Other countries do things differently. In the US, 'design patents' (similar to 'design rights' in Europe) protect soft innovations.

2.9 Summary

We have defined two forms of soft innovation: innovation in aesthetic or intellect-based products, and aesthetic or intellect-based innovation in products that are primarily functional. The definition of soft innovation encompasses changes in products that impact upon sensory perception. We have drawn contrasts and comparisons with the OECD innovation definitions which we have argued do not adequately encompass soft innovation.

Many soft innovations are embodied in new differentiated products and we have distinguished between horizontal and vertical soft innovations. But not all innovations are significant. We have argued that the significance of a soft innovation is better judged by its market impact, rather than the standard OECD criterion of changed functionality (or other criteria such as artistic significance).

Some of what we call soft innovation has already been labelled by other authors as aesthetic, formal or artistic innovation. But by giving all such innovations a common label, we can better understand the potential total extent of such activity. Moreover, common categorisation of the different activities emphasises the extent to which ignoring them can distort the direction and extent of total innovation activity in the economy.

Unless we include soft innovation, we are in danger of under-recording total innovative activity. And if we see all innovation as functional, the potential of soft innovation will be ignored in policy discussions as will the need for any potential support.

Our next step is therefore to first demonstrate that soft innovation activity is indeed quantitatively significant. The next three Parts consider how the extent of soft innovation may be more precisely measured, and also provide some quantitative indicators using the metrics suggested.

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Part 3: Aggregate measures of soft innovation

3.1 Introduction

Soft innovation may be measured at the macro or micro level

Having defined soft innovation, we now attempt to quantify the amount of soft innovation taking place in the economy and contrast this with the extent of traditionally defined innovation. Being a new concept, no bespoke data collection exercises have previously been conducted.[21] Instead, we must use proxy indicators collected for alternative purposes.

Economists have measured innovative activity in the past in two main ways – through inputs to the process of generating innovation e.g. R&D spend, and through outputs of innovative activity such as patent counts (see, for example, Griliches, 1995). We have seen in the previous chapter why these are not sufficient to measure soft innovation.[22]

One traditional measure reflects changes in productivity: as innovation occurs and better products are produced more efficiently, so productivity increases. Unfortunately, productivity measures depend on how well the output (and input) measures are "quality adjusted" and such quality adjustment is either non-existent or built on weak foundations in official statistics. The most widely used method for quality adjustment is the matched models approach, although the most theoretically supported approach involves the use of hedonic methods[23] (see, for example, Griliches, 1990 and Trajtenberg, 1990). In both cases, products are considered as mixtures of performance characteristics, and quality is said to improve as the amount of such characteristics incorporated increases.

For practical and conceptual reasons, aesthetic and intellectual characteristics of products are rarely incorporated in such approaches, so soft innovation is unlikely to be properly measured. Requena-Silvente and Walker (2006) show how hedonic price indices which omit relevant but unquantifiable product attributes are subject to considerable bias. In Griliches's terminology, soft innovations are either in hard to measure sectors or comprise change that is hard to measure (see Berndt and Hulten, 2007).

An alternative to macroeconomic approaches involves identifying unit-based measures of soft innovation at the industry level, such as the number of new books launched or the number of new CDs put on the market. Weighting particular innovations by market impact can indicate those of greatest significance. We explore this approach in the following two Parts. However, such an approach alone would neither provide a global picture nor enable comparisons across industries or time because of the different types of outputs in different industries and resultant different units of measurement.

There are several macroeconomic indicators of the extent of soft innovation

In this Part, we pursue a number of alternative measurement exercises to provide indicators of the extent of soft innovation in the economy as a whole. These are complementary to the microeconomic exercises that follow, as each has its advantages and disadvantages.

We explore five different macroeconomic indicators:[24]

Innovation survey indicators for the creative industries. Marzal and Esparza (2007) discuss

21. The OECD (2006) Oslo Manual recommends a means by which data on marketing innovations, which are considered as part of soft innovation, may be collected, but as yet the approach has not been implemented. The guidelines state: "To gain an idea of the scope of marketing innovations, enterprises might be asked to estimate the percentage of total turnover that is affected by marketing innovations. Innovation surveys can ask two separate questions concerning marketing innovations. One asks for an estimate of the percentage of turnover due to goods and services with significant improvements in product design or packaging. The second asks for an estimate of the share of turnover affected by new marketing methods in pricing, promotion or placement."
22. In considering measures for innovation in the creative industries Handke (2007), in addition to separating input and output measures, also distinguishes between humdrum innovation (which is TPP innovation in the sense used here) and content creation which is more like soft innovation as defined here. He also emphasises how content creation cannot be measured via R&D and patents. His recommendations for measuring content creation are discussed in Chapter 4 in the context of the music industry.
23. Hedonic in this sense considers products as made up of different performance characteristics which can be valued and summed to provide a measure of quality.
24. Jensen and Webster (2007) compare different measures of innovation across a given sample of firms and find that they vary substantially. There are thus advantages to using a wide spread of measures. Jensen and Webster (2007) in fact recommend trademarks as a superior macro and micro indicator.

several problems with using innovation survey indicators, but the data merit some exploration.

Measures of innovative inputs in the creative industries: this approach looks at employment in those cultural industry sectors or activities that generate soft innovations.

Measures of inputs to soft innovation other than in the creative industries: as indicators of innovative activity in the creative industries do not extend to such activity elsewhere, this tries also to measure soft innovation in other parts of the economy.

Design activity: much activity generating soft innovation (in both the creative and other industries) may be labelled "design" and thus exploration of data on design and design rights may also give some insight into the extent of soft innovation (both as an input and output measure) in both the creative and other sectors.

Copyright and trademarks: although it is not possible to patent aesthetic innovations, they can be trademarked or copyrighted. Counting trademarks and copyrights is thus a useful output measure covering the creative and other sectors.

25. First results of the 2007 UK Innovation Survey are available (Robson and Haigh, 2008). Although this contains a large sample of firms from the creative industries, the results for these firms are not yet separately available.
26. This is despite the fact that businesses are specifically asked not to consider innovations of an aesthetic nature in their survey responses.

3.2 Innovation surveys

Over the last 15 years National Statistical Offices in Europe and elsewhere have undertaken a series of Innovation Surveys (The Community Innovation Surveys, CIS) using very similar questionnaires. These surveys have provided considerable new and insightful data on the innovation process. The questionnaires are built on the definitions in the Oslo and Frascati manuals.

CIS4 shows the creative industries to be particularly innovative

The latest widely available data are in the Fourth Community Innovation Survey (CIS4) covering the 2002-2004 period.[25] Wilkinson (2007) explores innovation in the creative industries by considering the UK returns to CIS 4 using three main indicators of innovation.

1. If a firm is engaged in: the introduction of new or significantly improved products (goods or services) or processes; innovation projects not yet complete or abandoned; expenditure in areas such as internal research and development, training, acquisition of external knowledge or machinery and equipment linked to innovation activities.

2. If a firm is engaged in organisational innovation.

3. If a high proportion of the firm's turnover is due to new or improved products.

He reports that 78 per cent of firms in the creative industries meet the first criterion, a higher proportion than in any of the other broad industry categories identified in the data. In the creative industries, on average, new to market products account for almost twice as much industry turnover as in other industries. In addition, 52 per cent of firms are found to have undertaken organisational innovation compared with 40 per cent for firms in other industries.

The survey data (see DTI 2006) also indicate that creative businesses across the UK have a higher proportion of graduates and a much higher proportion of Science and Engineering graduates. The creative industries also tend to operate on a more national and international level, with just under a quarter of their largest markets being regionally or locally based. Creative businesses are also more active at protecting their innovations, partly due to their greater originality.

These findings paint a picture of the creative industries as very innovative, and given that product innovation in the creative industries is clearly related to our definition of soft innovation, it is possible that much of what is being observed is soft innovation.[26] There are however a number of important qualifications:

1. The data refer only to the creative industries and do not include other parts of the economy where soft innovation is also important.

2. CIS4 sampled only around two thirds of the sectors which make up the creative industries. The data are not therefore comprehensive.

3. It is not clear what the responses to questions on turnover due to new or improved products refer to. According to the definitions, they should refer strictly to TPP innovation, but the very high numbers suggest that not all businesses may have interpreted the question this way.

4. The questionnaire is based on innovation definitions prior to those given in OECD (2006), especially the previously discussed definition of marketing innovation.

Thus, although the data suggest considerable innovative activity in the creative industries, and perhaps more than in other sectors, the innovation surveys provide only a partial picture of soft innovation.

3.3 Employment of innovators in the creative industries

Higgs *et al.*(2008) consider employment in creative activity as made up of three 'modes': specialist workers within a creative profession within a creative sector; workers in a non-creative profession within a creative sector; and workers in a creative occupation outside the creative industries. The creative core is then defined as those workers engaged at the pre-creation stage (including preservation, access, collecting and licensing activities) and the creation stage of the value chain. They estimate that the numbers employed in specialist creative occupations in 2001 was almost 1.2 million. This compares with an official estimate of total UK employment on business R&D in 2005 of 146,000.[27]

Even after allowing for deficiencies in the available data, soft innovation activities in the creative industries alone appear to be far greater than more traditional R&D activities, not only in that sector but in the economy as a whole. This suggests that resources devoted to soft innovation considerably exceed those devoted to TPP activities.

3.4 Employment of soft innovators outside the creative industries

This section considers soft innovation outside the creative industries. We first consider the employment of creative workers in creative occupations outside the creative industries, following Higgs *et al.*(2008).

The numbers employed in specialist creative occupations outside the creative industries considerably exceed the number of R&D workers in the economy

Higgs *et al.*(2008) estimate that the number employed in specialist creative occupations outside the creative industries in 2001 was 645,067, representing around 2.5 per cent of the total UK workforce. Although this may include workers producing functional innovations, it is so much greater than the 147,000 employed on Business R&D in the economy to suggest many employees are involved in soft innovation.

3.5 Design

A fourth measure of soft innovation relates to design activity, where we can construct both input and output measures. On the input side, we can measure labour and other inputs to design activity. On the output side, we can count registered design rights. The second Oslo manual states that there are two important types of design activity and these are to be treated differently (OECD, 2006, page 41):

> *Industrial design is an essential part of the TPP innovation process.. it is listed…. in the same subsection as tooling up, industrial engineering and production start-up, [but] may also be a part of the initial conception of the product or process, i.e. included in research and experimental development, or be required for marketing technologically new or improved products.*
>
> *Artistic design activities are TPP innovation activities if undertaken on a technologically new or improved product or process. They are not if undertaken for other creative product improvement, for example purely to improve the appearance of the product without any objective change in its performance.*

Industrial design expenditures are therefore very close to R&D and may even be included within R&D as an input to generating TPP innovations. However, design expenditures aimed at producing soft innovation, which would be called 'artistic design', would not be considered as contributing to TPP, nor included in R&D data.

But a measure of expenditure on artistic design would, in principle, indicate the level of activity in the production of soft innovations. Unfortunately, the available data relate to design activities as a whole and therefore conflate soft innovation and TPP activities. That said, in the UK Innovation Surveys, unlike other national innovation surveys, design expenditure is separated from other investments for innovation. This enables some

27. See http://www.statistics.gov.uk/pdfdir/berd0109.pdf

quite detailed analysis of the role of design and creativity, much work on which has been surveyed in DTI (2005).

Spending on design is related to soft innovation activity, but it is not the same thing

Using CIS4, design spending in the UK is calculated as about five per cent of the total of business spending directed towards innovation, a higher share than external knowledge acquisition, but considerably lower than the shares of R&D, capital expenditure and marketing. Using CIS4, Tether (2006) shows, as reproduced in Table 2, that, while a larger number of firms recorded R&D and capital expenditure than recorded design expenditure, some 19 per cent recognised an explicit role for design in preparing for or implementing innovations in products or processes.[28] This design investment propensity does not vary significantly across industrial sectors, with similar proportions reporting design activity in knowledge intensive services and retail as in manufacturing industries.

Similarly, DTI (2006) suggests that a UK Design Council survey (Design Council 2005) can be used to define a "design-using" approach to innovation. A subset of firms that engage in R&D activity can be similarly characterised as technology-led, and assign some importance to patents to protect their innovations. The DTI estimates that 34 per cent of firms in the Design Council survey are technology-led (of whom only 9 per cent are design users) and 66 per cent are not (of whom 58 per cent are design users).

Of course, there may be a substantial overlap between the two sets of firms with design as a complementary investment to translate R&D results into new and improved products and processes. Tether (2006) finds that 71 per cent of those firms with specific design activity also have in-house R&D, 81 per cent have capital expenditure, 76 per cent spend on training (for innovation) and 63 per cent on marketing. Thus different innovation-directed business activities tend to be deployed jointly which makes measurement harder. Tether also finds that design follows other innovation investments, rather than the other way round.

Although far from definitive, these data suggest that there is much design activity over and above activities counted as R&D. This activity may be associated with R&D or even prompted by R&D, but as it contributes to the innovation process it may well indicate soft innovation.

Likewise, output measures of design activity are related to soft innovation outputs

In the UK, designs that are artistic and are not mass produced receive automatic copyright protection. However, copyrights are not registered,[29] so counting copyrights as a measure of design activity is not feasible (see below).

There are two other IPR alternatives. One is the unregistered Design Right, free automatic protection for up to 15 years after an original design is created. The second is the Registered Design,[30] giving up to 25 years protection. An Unregistered Design Right can only prevent

28. The CBI (2007) estimates that if market-related innovation work, design and innovation-related capital expenditure and training are all included, then average investment in innovation in the UK is about 5 per cent of turnover.
29. Although can be in the US.
30. Equivalently design patents in the US.

Table 2: Proportion of respondents with different innovation investments, UK, 2005

Intra-mural R&D	32%
Extra-Mural R&D	12%
Acquisition of machinery, equipment and software	47%
Acquisition of external knowledge	14%
Training in connection with innovation	42%
Design functions	19%
Marketing related to innovations	25%

Source: Tether (2006)

copying, whereas a Registered Design yields a true monopoly and applies even if an imitator comes up with the same or a similar design independently and without copying. In the UK, such design protection has been available for almost 50 years. From 2002, the Design Right has been extended so that there are now European Community-registered Design Rights and European Community unregistered Design Rights.[31]

The number of design registrations may provide an indicator of innovation. This measure would cover both TPP and soft innovation, so a good measure of soft innovation could be the difference between the numbers of design rights granted and some measure of TPP innovation, such as R&D and/or patents granted. Unfortunately, data from CIS4 (see HM Treasury, 2006) indicate that across all firm sizes only 4 per cent of respondents consider registration of design as an IP protection mechanism of high importance, compared with 11 per cent citing confidentiality agreements, 5 per cent patents, 16 per cent trademarks and 6 per cent copyright. In larger firms with more than 250 employees, the figures are higher at 11 per cent, 22 per cent, 13 per cent, 16 per cent and 10 per cent respectively, but this still suggests that design registrations would be a very incomplete indicator of innovation.

In the UK, Patent Office data indicate that registered designs fell from 9,000 in 2002 to less than 4,000 in 2005. European data[32] might be used to give some indication of different rates of (TPP and soft) innovation across countries, but German dominance of registrations may simply reflect greater use of the system rather than greater innovation.

So, although design activities data should in principle allow a good measurement of innovation and soft innovation activities, their usefulness is somewhat limited in practice.

3.6 Copyright and trademarks

Copyright and trademarks are formal means by which innovation, and particularly aesthetic or intellectual innovations, may be protected.

3.6.1 Copyright

Headcounts of copyrights are a possible indicator of soft innovation

Copyright ensures that a work cannot be reproduced in another medium without the permission of the holders of the copyright.[33] Copyright does not protect ideas, only the work itself. It is provided automatically and protected through the courts. Copyright protects literature, including novels, manuals, computer programs, song lyrics etc.; drama, including dance and mime; art, including paintings, engravings, photographs, architecture, maps and logos; layouts; recordings; and broadcasts of a work. Copyrighted work may have other intellectual property protection. It may even have several copyrights – a music CD may have copyrights for individual songs, sound recordings and logos. The logo may also be registered as a trademark. Copyright is so associated with the creative industries that some authors have defined a sector called copyright protected industries (e.g. Theeuwes, 2004) that overlaps almost completely with the official definition of the creative industries in the UK.

Given that copyrights do not have to be registered, it is difficult to collect data. Mazeh and Rogers (2005) observe that in each decade since the 1970s, the number of copyright legal disputes in the UK has increased, but it is hard to know whether this is as a result of more use of copyright (and thus more soft innovation) or whether copyright has become more valuable (and therefore more likely to be defended).

31. See www.ipo.gov.uk/design/d-applying/d-should/d-should-designright.htm
32. Data on European Design Rights can be found at www.oami.europa.eu/en/office/stats.htm
33. See www.ipo.gov.uk/copy.htm
34. See www.ipo.gov.uk/tm.htm

3.6.2 Trademarks

Trademarks are instruments that protect corporate identity.[34] Application may be made to register a trademark that is distinctive, not similar or identical to any earlier marks, and not deceptive or contrary to law or morality. The mark may register a name, logo, slogan, domain name, shape, colour or sound. Renewal in the UK is every ten years.

Trademark data suggest high and increasing levels of soft innovation in a wide selection of sectors

As trademarks are registered, they may be counted. They therefore provide a valuable measure of the outputs of innovative activity. Although soft innovations cannot be patented, they may be protected by trademarks. But – like design rights – trademarks may also be used to protect TPP innovations and so trademark data do not provide an unadulterated measure of soft innovations. That said, trademark counts are arguably a superior indicator of the sum of TPP and soft innovations than, say, R&D, because R&D excludes soft innovation. It may also be the case that in certain service industries, trademark registrations will be a much better

indicator of total innovative activity than R&D because such industries will have much more soft innovation.

Trademark counts have the disadvantage of not distinguishing significant from insignificant innovations. Some trademarks will protect widely used innovations whereas others may cover products with very small market shares. In principle, one could weight marks by the market share of the product protected, or, following the practice applied to patent counts, use renewal data to reflect their importance. The analysis reported here however concentrates on simple headcounts and does not use weighting.

Greenhalgh *et al.* (2001) provide considerable data and analysis on trademarks and related service marks (a trademark used to identify a service rather than a product) in the UK and the US. Much of what follows is based on their work. Greenhalgh et al's (2001) data source[35] details all trademark applications made in the previous six years, along with earlier applications which had not been allowed to lapse or abandoned before then. In other words, it encompasses new applications made between 1989 and 1995, but retains a count of the stock of "live" trademarks at 1989 taken out in earlier years. Trademarks are divided into 42 classes (economic sectors), of which 34 relate to goods and eight relate to services. It is found that:

- Considering all goods versus service marks, goods marks accounted for 94 per cent of pre-1989 surviving trademarks, for 82 per cent of applications in 1989 and for 77 per cent of applications in 1995; that is, a larger (but declining) percentage of the total marks throughout the period.

- Of the five classes enjoying the highest rates of expansion over the whole period, four were service sectors for which registrations grew by more than 100 per cent in two years: Advertising and Business; Communication; Education and Entertainment and Miscellaneous Services. Two other service classes – Insurance and Financial and Material Treatment – also experienced growth of more than 80 per cent between 1989 and 1995, though this growth was concentrated in the last two years.

- The period 1989 to 1995 is best regarded as two smaller sub-periods: 1989 to 1993, and 1994-1995; the first of these sub-periods saw trademark applications fall by 15 per cent. Of applications across the total 42 sectors, 37 were smaller in 1993 than 1989, and only five were larger. All the expansion came in the last two years of the data, which might reflect changes in registration requirements.

- Very different time trends are observed for UK patent publications, which fell over the study period while trademark indicators rose.

With changing registration requirements, it is hard to interpret the resulting fall in total applications over time. However, the different patterns in the overall growth of patenting and trademarks suggest an increasing relative importance over time of soft innovation (which can be trademarked but not patented) relative to TPP innovations (which can be both trademarked and patented). In addition, the growing relative importance of the service sectors may also reflect relatively more soft innovation.

Greenhalgh *et al.* (2001) find that that the pattern observed in the UK was also seen in the US for the period 1989-95: although overall rates of growth for both goods and service marks were lower than in the UK, there was more rapid growth in service marks in later years. Total application rates for service marks rose particularly rapidly from 1993.

Greenhalgh and Rogers (2005) have extended this earlier work looking at a sample of 2,054 UK firms and UK and EC trademarks and UK and European Patent Office (EPO) patents for the period from 1996-2000. Echoing their earlier results, they find that:

- For the whole sample, the proportion of firms making at least one UK trademark application within any year (averaged over the five year period) was 30 per cent and the average annual number of UK trademarks per firm was 4.7.

- Patenting activity was lower, with 9 per cent of sample firms publishing a UK patent per year and 8 per cent publishing an EPO patent, whilst the number of annual patents per firm was modest: 0.35 UK and 0.77 EPO patents.

- Around 18 per cent of sample firms reported R&D, the average annual value of this expenditure being £23 million at 2000 prices.

- The service sectors were particularly active in trademarks whereas the manufacturing

35. Marquesa UK Trade Marks (A) Applications CD-ROM, Search Systems Ltd., 1996.

and utilities sectors were active in both trademarks and patenting.

Of particular interest is Table 3 below taken from Greenhalgh and Rogers (2005) illustrating the sectoral breakdown of trademark and patent registrations. It shows the proportions of firms applying for IP protection using the different mechanisms at least once. The table shows that patent applications (either to the UK patent office or to the EPO) are concentrated in manufacturing (40 per cent) and utilities (50 per cent), with most other sectors having less than 12 per cent of firms applying. This suggests that TPP innovation is concentrated in these two sectors.

The trademark applications data show most firms in manufacturing (67 per cent) and utilities (85 per cent) also applied for trademarks. As the proportions are higher than for patent applications, this could reflect soft innovation activity over and above TPP activity. However, other sectors also show extensive trademark activities with retail showing a greater proportion of firms applying than in manufacturing, and seven other sectors having more than half the sample firms applying for UK trademarks. Taken together the patent registrations and trademarks suggest that there are high levels of soft innovation in a wide variety of sectors – not just where TPP innovations are prevalent.[36]

3.7 Conclusions

Our aim in this Part has been to explore input and output indicators that could measure the extent of soft innovation in the economy. We have considered measures of innovation in the creative industries, taken from the Community Innovation Survey; core creative employment in the creative industries; creative employment in other industries; design activities in all industries; and copyright and trademark applications in the UK and Europe. None of the measures are ideal; they all have problems relating to data availability, interpretation or evaluation, but jointly they tell a consistent picture.

The CIS survey responses and the design data suggest that soft innovation is extensive across the whole economy, and relative to TPP innovation, is particularly important in the non-manufacturing sectors. The survey data also suggest that the rate of innovation in the creative industries may be faster than in other sectors. The employment data suggest that seven times as many people are employed

36. Trademark data themselves are imperfect indicators of innovative activity – like the other indicators discussed – and must also be used carefully. For example, it is not easy to adjust the trademarks data for quality.

Table 3: Proportion of firms making an application for IP, 1996-2000, by sector

Sector	No. firms	UKTM	ECTM	UKPAT	EPOPAT
1 Agriculture/Mining	67	0.19	0.12	0.21	0.12
2 Manufacturing	640	0.67	0.55	0.40	0.35
3 Utilities	26	0.85	0.62	0.50	0.42
4 Construction	89	0.39	0.22	0.22	0.09
5 Finance	191	0.52	0.26	0.05	0.06
6 Real Estate	112	0.22	0.12	0.03	0.01
7 Wholesale	181	0.52	0.33	0.12	0.07
8 Retail	132	0.75	0.40	0.08	0.05
9 Hotel/Catering	54	0.65	0.35	0.06	0.00
10 Transport/Commun.	115	0.57	0.43	0.10	0.05
11 Business Services	259	0.57	0.43	0.08	0.06
12 Other Services	188	0.56	0.37	0.10	0.12

Source: Greenhalgh and Rogers (2005)

in activities encompassing both soft and TPP innovation in creative and other industries than are estimated to work in R&D alone.

We have suggested that one useful measure of soft innovation, at a high level of aggregation, may be an indicator of the difference between the level of trademark activity and the level of R&D or patenting activity. This has the advantage of readily available time-series data. This indicator shows extensive soft innovations in most industries with some suggestion that soft innovation has been increasing over time. Compared with the picture of innovation painted by TPP indicators alone, innovation appears to be more balanced across sectors when soft innovation is included.

The analysis of registered trademarks and design rights suggests that future macroeconomic research need not be confined to analysis of TPP innovation alone on the grounds that only indicators of TPP such as R&D and patent counts are available.

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Part 4: Soft innovation in the creative industries: books, recorded music and video games

4.1 Introduction

In this Part we look at soft innovations in particular products and industries to explore how such innovation may be measured. We also map its extent, nature and determinants. We comment on how functional or TPP innovation interacts with soft innovation in different economic sectors. We consider products that are aesthetic or intellectual in nature and are chosen to be indicative of soft innovation in the wider creative industries. In the next Part, we consider products that are not part of the creative sector. In both cases, measures of the extent of innovation rely to a large extent on numbers of new product variants launched, using market success as an indicator of significance to weight that data.

Three industries in the creative sector are considered here

We consider three specific examples in this chapter:

1. Books, where our main interest is in new books launched, the lifetime profile of the sales of a book, relative sales of successful and unsuccessful books, and the relationship with TPP innovations.

2. Recorded music, where we also find a much richer range of soft and TPP innovations, especially as music recording and reproduction relies on changing hardware.

3. Video games, where the hardware-specific nature of some software creates a more complex pattern of innovation and sales.

4.2 Product variant launches as a measure of soft innovation

Our analysis is based on the number of new product variants launched per period.[37] The most basic such measure is a simple headcount of the number of new variants launched. More launches means more soft innovation. A better measure corrects this for market size by considering the ratio of the number of new variants launched in a period relative to the number of existing variants, in other words the rate of soft innovation.

There are several ways to measure significant innovation

However, it is misleading simply to count the raw number of new variants launched each period as no allowance is made for significance. Many variants may be launched, but very few may sell well. A better indicator of the extent of innovation would be the sales- or market share-weighted numbers of new and existing variants.[38]

A useful sales-weighted measure of innovation can be constructed as $I(t, n, \tau) = s(t, \tau)/S(t, n)$ which for any time t, and for the highest selling n variants, measures the sales (value or number) of new variants, $s(t, \tau)$, launched in the period (t, τ) as a proportion of the sales (number or value) of the total highest selling n variants, $S(t, n)$. The greater are the sales enjoyed by new variants the higher the measured rate of innovation.

The higher the value of n, the more comprehensive the market data needed to measure the rate of significant soft innovation. But as we see below, sales in creative sectors typically decline rapidly once one moves away from the leading variants and thus n may not

37. As recommended by Png (2006).
38. Although sales-weighted measures of innovative activity have the disadvantages that they may reflect diffusion patterns as well as, or instead of, innovation patterns, and may classify sleepers (products that take a long time to have market impact, e.g. Tolkien's 'Lord of the Rings') as non-innovative.

need to be too large in practice. The choice of τ depends on the speed with which new variants are purchased (and so may be chosen differently for different products or countries). The indicator may be derived at the level of the market, or at the level of the firm.[39]

4.3. Book publishing

4.3.1 Introduction

The printed book has now been in existence for more than 500 years. In that time, the means by which it is written, printed, reprinted and sold has changed extensively. Such process innovation is one characteristic of the book publishing industry. Here however the primary interest is soft innovation in the industry, reflected in the number of significant new titles launched on the market.

The book publishing industry indicates extensive and increasing levels of soft innovative activity

New titles are launched and made available to the buying public every week. Those where sales exceed the initial print run will be reprinted (or perhaps made available on CD or in electronic downloads). Those where sales do not meet expectations may remain available but may be taken off the market or pulped. Most consumers will only buy the title once (although with some books, such as the Bible or the Koran, this clearly may not be a good assumption).

The Publishers Association[40] estimates that there are about 60,000 publishers in the UK with at least one title in print, but only 2,719 were big enough to be registered for VAT. Nielsen Bookscan estimates that there are about 1.6 million titles (2005) currently available for sale in the UK. Table 4 presents data on the size of the UK market in 2004 and 2005, with total sales being about £2.8 billion in 2005.

4.3.2 The number of new titles launched

The crudest measure of soft innovation is a headcount of the number of new titles published. Whitaker Information Services estimates the total number of new titles and new editions published in the UK as 206,000 in 2005 compared with 161,000 in 2004. The data suggest (Table 5[41]) that the number of new titles published annually is increasing over time.

A headcount of new titles is a crude measure of soft innovation. One step towards refining it is to correct for the size of the market by relating the number of new book launches to the existing stock of titles already on the market. For the UK, the Nielsen Bookscan and Whitaker Information Services data together yield an estimated rate of innovation at 12.8 per cent per annum in 2005.[42] In an economy where the rate of overall growth is approximately 2.5 per cent per annum, this is a rapid rate of innovation. However, it may also be misleading as no allowance is made in this calculation for the significance of new titles. We now consider indicators of significance.

4.3.3 Significance of new titles

Many new titles are soft innovations of little economic significance. Using data from the

39. For an individual firm the measure might reflect the proportion of the sales of its own n best selling variants that have been launched in a given specified period. Alternatively one might use an indicator such as Ii(t, n, τ) = si(t, τ)/S(t, n) which for any time t, and for the highest selling n variants, measures the sales (value or number) of those of these variants, s(t, τ), launched by firm i in the period (τ, t) as a proportion of the sales (number or value) of the total highest selling n variants in the market, S(t, n).
40. A trade body for the UK industry (see www.publishers.org.uk).
41. Data on the number of books launched for a number of countries can be found at: www.uis.unesco.org/TEMPLATE/html/Exceltables/culture/Books.xls. These show that in most countries the number of titles published per annum is on an upward trend.
42. This is based on 206,000 new titles added to 1.6 million titles in print.

Table 4: Value and volume of sales of UK book publishers, 2004-5

	Total	Home	Export
Value Sales (£million)			
2005	2,768	1,768	1000
2004	2,660	1,751	909
Unit Sales (£million)			
2005	788	459	329
2004	756	468	288

Source: UK book publishing industry statistics yearbook 2005, The Publishers Association 2006, http://www.publishers.org.uk

Table 5: New book titles and editions launched, UK, 1996-2002, by category

Category	1996	1997	1998	1999	2000	2001	2002
Art	2,154	2,213	2,304	2,523	2,788	2,945	2811
Biography	3,292	3,164	3,180	2,900	3,114	3,456	3,232
Children's books	8,045	8,208	8,497	9,099	10,397	10,784	10,519
Computers	3,515	2,978	3,010	3,886	3,803	3,785	4,381
Economics	4,519	4,305	4,529	4,670	4,726	5,095	5,232
Education	2,170	2,055	2,011	1,838	2,071	2,153	2,742
Engineering	1,854	1,651	1,851	1,706	2,069	2,137	1,951
Fiction	9,209	8,965	9,236	9,800	10,860	13,076	11,810
History	4,348	4,168	4,546	5,193	5,771	5,517	6,385
Law	2,562	2,882	2,554	2,848	2,902	3,579	3,799
Literature	3,107	2,884	2,930	2,936	3,150	3,130	3,270
Management	2,931	3,086	3,221	3,393	3,203	2,903	3,749
Medicine	3,964	4,052	3,842	4,093	4,260	3,465	3,544
Political Science	2,294	2,517	2,532	2,670	2,863	2,953	3,441
Psychology	1,290	1,321	1,329	1,383	1,490	1,452	1,510
Religion	4,331	4,109	4,379	4,595	4,466	4,229	4,641
School textbooks	3,629	3,049	4,141	3,963	4,640	3,808	4,464
Social Sciences	4,068	4,254	4,400	4,495	4,547	4,638	5,134
Social Welfare	2,678	2,497	2,879	2,655	2,652	2,694	2,991
Travel	2,155	2,258	2,802	3,077	3,223	3,535	3,420
SUBTOTAL	**72,115**	**70,616**	**74,173**	**77,723**	**82,995**	**85,334**	**89,026**
Other categories	29,389	29,413	30,461	32,432	33,420	33,667	36,364
TOTAL	**101,504**	**100,029**	**104,634**	**110,155**	**116,415**	**119,001**	**125,390**

(Figures include new and revised titles). http://www.publishers.org.uk/paweb/paweb.nsf/pubframe!Open)

Source: Whitaker Information Services http://www.whitaker.co.uk

New York Times on fiction book sales, Sorensen (2007) observes that the distribution of book sales is heavily skewed towards a number of popular titles. Of the 1,217 books for which sales data were observed, the top 12 (1 per cent) accounted for 25 per cent of all six-monthly sales and the top 43 (3.5 per cent) accounted for 50 per cent of sales. The 205 books that made it to the New York Times bestseller lists accounted for 84 per cent of annual sales in the sample. To find the most significant sellers – and innovations – one does not have to go far down the sales rankings.

This finding is reinforced by a simple exercise using UK data from the top ten fiction paperbacks in the week ending 28 April 2007 (sourced from The Times newspaper) which showed that compared with the top seller for the week (unit sales 40,285), the tenth bestseller had sales of only a quarter (11,930), and thus the sales of titles quickly tail off

as one moves down the sales order. So in any study of significant soft innovations in publishing, most new titles may reasonably be ignored and the analysis can concentrate on the bestsellers.

This assumption is also supported by data on authors' earnings. Kretschmer and Hardwick (2007) show that writers work in winner-take-all markets with a resulting highly unequal distribution of income. The top 10 per cent of professional writers in the UK, for example, earn about 60 per cent of total income (at least £68,200 per annum); the bottom 50 per cent earn about 8 per cent of total income. In their UK sample, 7.2 per cent of professional writers earn £100,000 or more from writing (mean = £188,062). In Germany, although less unequal than in the UK, the top 10 per cent of professional writers earn about 41 per cent of total income (they earn at least €40,000); the bottom 50 per cent earn about 12 per cent of total income.

4.3.4 Significant innovations

So, using weekly sales data from the Top 25 bestselling printed books in the UK from the Saturday Times (sourced originally from Nielsen Bookscan) we can illustrate the life cycle of sales for bestselling books. Considering just those four books that entered the top 25 on 2 February 2008, reveals a cycle as in Table 6. This suggests that sales of books peak early after launch and then gradually die away, in terms of rank. Specifically, that sales peak, in most cases, in the second week on the chart (although book two peaked in week 6) and that rank is also highest in the second week on the chart.

Using weekly data from the 'New York Times Best Seller List' for fiction titles[43] from January 1970 until the present, we also explore the patterns of sales of the top ten bestselling titles in the US. The top ten items from the list are selected in each week providing ten items for each week of data over 35 years. These data have then been grouped into five year periods for the analysis-1970-74, 1975-79, 1980-84 ,…, 2000-4 – resulting in seven time periods from 1970 to date with around 2600 data points for each time period – i.e. ten entries (i.e. the top 10) x 52 weeks x 5 years.

For each five-yearly period, the number of titles that appear in the top ten and for how many weeks these titles remain there are calculated. The same analysis is undertaken for authors. The main limitations of these data are that: (i) there are no sales figure data so there is no indication of the order of magnitude between the top items and the lower items and as such, the top seller is treated the same as the tenth seller, and (ii) titles that cross two five-year time periods may be under-represented in both periods. The basic data are represented in Table 7.

43. Taman Powell, a WBS doctoral student, undertook the majority of the analysis for this section.

Table 6: Life cycles of entries to UK 25 bestselling books list, 2/2/08, rank and unit sales

Week	1	2	3	4	5	6	7	8
Book No.								
1 Rank	8	1	4	12	12	22		
Sales	20,616	28,719	20,968	19,160	15,293	15,456		
2 Rank	16	5	6	13	8	6	21	25*
Sales	10,835	20,756	19,170	19,076	15,865	23,571	13,895	11,936
3 Rank	21	19						
Sales	10,040	11,030						
4 Rank	25	14	16	22	19	18		
Sales	8,273	14,445	12,840	13,307	12,819	15,088		

* This book re-entered at 16 (14729) the following week. Source: Times, books section, 2/2/08-22/3/08

Source: Nielsen Bookscan

Table 7: New York Times, Top 10 fiction bestsellers, numbers of authors and titles, 1970-2004

	1970-4	1975-9	1980-4	1985-9	1990-4	1995-9	2000-4
Titles Number in top 10	166	159	209	254	298	340	491
Titles Average weeks in top 10	15.7	15.6	12.5	10.2	8.7	7.7	5.3
Authors Number in top 10	120	116	130	146	159	162	215
Authors Average weeks in top 10	21.7	21.4	20.1	17.8	16.4	16.1	12.1

Source: New York Times

These data indicate that the number of titles that enter the top ten per period has increased significantly since 1970 – 74, with 166 in the first period and 491 in the later period. It is also clear that the number of weeks that a book spends in the top ten has fallen considerably. Under either metric the data suggest that the rate of innovation as indicated by the number of significant new products launched has increased three-fold over 30 years. A similar pattern appears with authors, the number entering the top ten in each five-year period has increased, but the time spent at the top has decreased.

This finding from the New York Times data that over time a greater number of titles have been entering the top ten and that the time spent there has reduced considerably, suggests that the product life cycle of significant innovations in book publishing has considerably shortened over the last 30 years.

4.3.5 A market share-based innovation indicator

It was suggested above that an indicator of innovation that measures the proportion of sales that arise from recently launched product variants would be of considerable utility in indicating patterns of significant innovation. Unfortunately, the New York Times exercise for the US market, although informative, does not provide a sales-weighted index of innovation because neither quantities sold nor sales revenue are available. However, a simple calculation suggests that in 2000-2004, a title on average spent 5.3 weeks in the top ten which is equivalent on average to 19 per cent of sales being from titles new to the top ten each week.[44] (The same calculation gives a much lower estimate of 6.4 per cent of sales on average each week being of books new to the top ten in 1970).

Further data have been collected[45] for the UK from the Sunday Times top ten paperback fiction bestsellers list each week. These data also include an estimate of the number of copies of each title sold that week (the data originate from Nielsen) and the number of weeks for which the title has been in the top ten. Data available for the period from January 2003 and are collected through to end December 2007 covering in total 237 weeks.

The measure of interest is the proportion of sales that arise from recently launched product variants. A recently launched product variant is defined as a book that has been in the top ten list for less than four weeks. The weekly sales of all books that fulfil this criterion are summed and then divided by the total sales for that week of all ten books on the weekly bestseller list.[46]

The data reveal that the average proportion of sales that arise from recently launched product variants for the five-year sample period is 45 per cent. The average for 2003 is 46 per cent, for 2004 is 42 per cent, for 2005 is 39 per cent, for 2006 is 43 per cent and for 2007 is 53 per cent. These data suggest that: (i) the rate of churn is high, reflecting a high rate of successful new product introduction, and (ii) over a short period i.e. since 2005, there is some evidence of increasing churn in the UK market for fiction paperbacks reflecting an increasing rate of soft innovation.

44. Simply, say, if a book on average is in the top ten for 5.2 weeks then in a year 100 books will appear in total, i.e. two new books out of ten on average will appear each week. If all books sell the same number on average then the two books will account for 2/10, i.e 20 per cent of weekly sales.
45. Diane Nicolaou, a doctoral student in Warwick Business School, undertook this work.
46. For two weeks every December (2003, 2004, 2005, 2006, 2007) there were incomplete data as the newspaper listed the Bestsellers for the whole year (but without how many weeks each book had been on the list or the weekly sales of each book). Also, towards the end of each year paperback fiction books were not ranked but replaced with children's books. There were also monthly bestsellers lists for April 2005, May 2005, September 2005, June 2006 and August 2007. These were excluded from average calculations. Some books had weekly sales of combined editions. These were included. Almost every month there was one week in which only five books were ranked.

4.3.6 Technological Product and Process innovation

TPP innovation also matters
The picture based on new title launches and sales patterns in this industry is one of extensive soft innovation. Behind this activity however there is also evidence of considerable product and process innovation that may be one factor driving the observed soft innovation.

For example, the introduction of the paperback edition (or more recently an electronic download) is a major TPP innovation that will have affected new title launches and product sales. In addition, the advent of word processors, the downplaying of the role of copy editors, the introduction of camera-ready copy and the demise of type setting, and also the general computerisation of production, stock control, ordering, printing and major changes in marketing (such as Amazon) have all enabled new books to be more quickly and more cheaply produced, launched and sold. All such TPP innovations will have contributed to the growing dynamism of the product portfolio.

4.3.7 Book publishing: an overview

Overall, the evidence for the book publishing industry indicates extensive and increasing levels of soft innovative activity as shown by an increasing number of significant innovations and more churn in the market as product life cycles shorten. Previous sectoral studies of innovation do not appear to offer any examples of equally rapid functional innovation.

This has not occurred in isolation. TPP and soft innovation have interacted, with soft innovation often driving the sales that demand TPP innovations as much as product innovations are leading to new titles. So their relationship should be seen as interrelated.

4.4 Recorded music[47]

4.4.1 Introduction

As with books, the recorded music[48] industry involves the launch of new titles or recordings on to the market. These titles will stay there for a while and may or may not sell in significant numbers. Eventually titles that do not sell are taken off the market. We can therefore use sales charts to measure innovation levels, as with books.[49]

The music industry has experienced significant innovations in media
The recorded music industry has undergone much more change in its media than books. The evolution from the 78 disc to the music download has been arguably more profound than the product innovations in publishing. These changes of course reflect TPP innovations, but they may have also impacted on soft innovation. After all, while consumers will probably only buy one copy of any title for a given medium, they may buy extra copies if extra media are used or the medium is replaced.

4.4.2 Media innovations

The main medium on which recorded music has been available since the 1970s is vinyl (and a record player) either as LPs or singles and tape cassettes (and a cassette player), and, from 1983, CDs (and a CD player). Tables 8 and 9 together chart their rise and fall over the last thirty or so years in the UK.[50]

Today, music downloads from the web are considerably changing the market place. The IFPI[51] estimates that worldwide, record companies' digital music sales have grown from 5.5 per cent in 2005 to around ten per cent of industry sales for 2006. Their value has almost doubled from $1.1 billion to approximately $2 billion. Single track downloads were estimated as 795 million in 2006, up 89 per cent on 2005. There are nearly 500 online music services available in over 40 countries worldwide. The number of tracks available online doubled, to over four million in 2006. This compares with around 150,000 CD albums available in the biggest traditional music stores.[52] Similar recorded content and new titles may well be available through the different media. Our main interest here however is not the media but the number of new recorded music titles launched across them.

4.4.3 Market size

IFPI Market Research, April 2007, shows that in the first quarter of 2007, 32 million UK albums were sold, along with 11.5 million singletrack downloads and 980,000 digital albums. For 2006 as a whole, overall album sales declined by 2.5 per cent to 155.1 million, but 2.2 million digital albums were sold between April and December 2006; digital sales comprised 1.4 per cent of the overall album market.

UK acts claimed a 61.9 per cent share of bestselling albums in 2006. Per capita annual album sales were higher in the UK than anywhere else in the world – with every man, woman and child buying an average of 2.9

47. Ernie Lee, a doctoral student in Warwick Business School, undertook much of the detailed data collection for this study of recorded music.
48. A discussion of the evolution of music and innovation in music prior to recording can be found in Scherer (2006).
49. Handke (2007) has suggested an alternative approach to measuring soft innovation that reduces to investment in the creation of new content and number and/or sales of products with new content. He undertakes a dedicated survey to look at innovation in small- and medium-sized companies in the German record market, but like here, his main measures regarding content innovation reduce to numbers of new recordings issued. He does not weight by importance.
50. The BPI – which is the source – stands for the British Phonographic Industry, the UK industry trade body. We use two tables as the data source for the first does not extend beyond 2000.
51. IFPI is a trade body that represents the recording industry worldwide, with a membership comprising some 1,400 record companies in 75 countries and affiliated industry associations in 49 countries.
52. Perhaps surprisingly one result of the digital revolution is that classical music was the fastest-growing music genre in the US, growing by 23 per cent in 2006, with exceptional digital sales on particular classical titles.

Table 8: UK sales[1] of CDs, LPs, cassettes, and singles[2] (millions)

	LPs	Cassettes	CDs	Singles[2]
1973	81.0	9.8	..	54.6
1974	89.5	14.0	..	62.7
1975	91.6	16.5	..	56.9
1976	83.8	16.0	..	56.9
1977	81.7	18.5	..	62.1
1978	86.1	20.6	..	88.8
1979	74.5	23.5	..	89.1
1980	67.4	25.2	..	77.9
1981	64.0	28.7	..	77.4
1982	57.8	31.5	..	78.6
1983	54.3	35.8	0.3	74.0
1984	54.1	45.3	0.8	77.0
1985	52.9	55.4	3.1	73.8
1986	52.3	69.6	8.4	67.4
1987	52.2	74.4	18.2	63.4
1988	50.2	80.9	29.2	60.1
1989	37.9	83.0	41.7	61.1
1990	24.7	75.1	50.9	58.9
1991	12.9	66.8	62.8	56.3
1992	6.7	56.4	70.5	52.9
1993	5.0	55.7	92.9	56.3
1994	4.5	56.0	116.4	63.0
1995	3.6	53.4	139.2	70.7
1996	2.4	46.2	159.7	78.3
1997	2.5	36.6	158.8	87.0
1998	2.2	32.2	175.7	79.4
1999	2.3	18.4	176.9	80.1
2000	3.2	11.4	201.6	66.1

[1] Trade deliveries. [2] All formats combined (7", 12", cassette and CD).

Source: British Phonographic Industry via www.statistics.gov.uk/StatBase/Expodata/Spreadsheets/D6507

Table 9: UK retail album sales, by format

	2000	2001	2002	2003	2004	2005	2006
CD	93.7	97.6	99.0	99.4	99.4	99.6	98.3
LP	0.6	0.5	0.4	0.4	0.3	0.2	0.2
Cassette	5.4	1.8	0.5	0.2	0.1	–	–
Digital*	–	–	–	–	–	–	1.4
Other **	0.3	0.1	–	0.1	0.3	0.2	0.2
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**

* Digital represents 9 million sales April-Dec 2006.

** Other include MiniDisc, DVD Audio, DVD Video and albums released as 7" single box sets.

Source: The Official UK Charts Company, BPI Statistical Handbook

albums each, ahead of Norway at 2.7 and the USA at 2.6. The singles market grew by 39.7 per cent with digital downloads accounting for 79 per cent of singles sales.[53]

In the US, the overall retail value of the record industry was $11.5 billion in 2006, a 6.2 per cent decline compared with 2005. Digital music formats again demonstrated growth in 2006, with 586 million digital singles downloaded in 2006, a 60 per cent increase on the year, and 28 million albums downloaded, a 103 per cent increase. Revenues from various mobile formats grew 84 per cent to $775 million and subscription service revenues were $206 million, a 38 per cent increase versus the previous year. The growth in digital revenues partially compensated for the decline in physical sales.

The music industry shows extensive soft innovation

4.4.4 Number of new titles

Data from the BPI Statistical Handbook confirm that the number of new and reissued titles is growing in the UK: a total of 33,524 new albums were released in 2006, compared with 31,291 in 2005 and 29,510 in 2004 (see also Table 12 below). Although the number of new titles being launched is a crude measure of soft innovation, these figures do indicate an extensive and increasing amount of soft innovation. However, to get a clearer picture we should separate the real success stories from the rest.

4.4.5 Patterns of success

Significant innovation can be largely observed by looking at the small number of bestsellers

The top five bestselling music genres in the UK are: Rock; Pop; Rhythm and Blues (R&B); Dance, and Middle of the Road (MOR). Rock's share of album sales in the UK has been increasing since 2003 (40 per cent in 2006), whilst Pop's share has fallen in the same period to 24 per cent in 2006. Together, these five genres accounted for 87.6 per cent of total album sales volume in 2006 (2005: 85.7 per cent; 2004: 83.2 per cent).

Using sales as a proxy for market impact, the data[54] in Table 10, referring to the bestselling singles in the UK, show how quickly sales fall off as a recording moves down the charts. Sales of the top single have varied from 1.5 to 3.6 times those of the tenth bestseller. This picture of a sharp decline in sales as one moves down the charts is further reinforced by Table 11 which lists sales of albums of different sales rank as a proportion of sales of the highest selling album. As with books, significant innovation can be observed by looking at the quite small number of bestsellers.

53. BPI; figures are sales registered 'over the counter', through retail outlets in the UK, recorded by The Official UK Charts Company. See http://www.bpi.co.uk/stats
54. Source: 'Pop is dead? Long live pop.' Times 2, pp.12 -13, Times January 11 2008. Based upon data from The Official UK Charts Company (sales to November 2007, including digital downloads from April 2005).

Table 10: Bestselling singles by decade, UK (million)

Rank	Decade					
	1950	1960	1970	1980	1990	2000
1	1.39	1.89	2.05	3.55	4.86	1.79
2	1.24	1.75	1.98	1.891	1.84	1.34
3	1.17	1.52	1.97	1.77	1.78	1.17
4	0.92	1.52	1.79	1.51	1.72	1.17
5	0.88	1.41	1.51	1.43	1.67	1.13
6	0.82	1.40	1.38	1.42	1.54	1.08
7	0.77	1.38	1.30	1.40	1.52	1.08
8	0.74	1.36	1.18	1.36	1.45	1.07
9	0.71	1.21	1.15	1.32	1.40	1.00
10	0.68	1.20	1.14.	1.20	1.35	0.95
1/10	**2.04**	**1.57**	**1.79**	**2.96**	**3.60**	**1.88**

Source: The Official UK Charts Company

Table 11: Chart album sales volume as a percentage of weekly bestselling album sales

Year	Chart position				
	10	20	30	40	50
1997	18	10	7	5	4
1998	28	15	10	6	5
1999	26	16	10	7	6
2000	20	12	8	6	4
2001	24	15	10	8	6
2002	24	16	12	8	7
2003	29	19	13	10	8
2004	30	19	13	10	7
2005	24	16	11	8	6
2006	22	14	9	7	5

Source: The Official UK Charts Company

The fact that very few albums have significant market impact is also confirmed by Table 12. These data indicate that typically around 230 albums a year make the Top 40 representing between 0.7 per cent and 0.8 per cent of all new releases.

Table 12: Number of new albums (all genres) released and charting, UK

Year	New album/titles(units)*	Top 40 debuts(units)**	Top 40 debuts(%)
1997	18386	n/a	
1998	17597	n/a	
1999	17865	n/a	
2000	19312	n/a	
2001	21316	n/a	
2002	25048	n/a	
2003	26537	n/a	
2004	29510	229	0.78%
2005	31291	236	0.75%
2006	33524	233	0.70%
2007	n/a	289	

Source: Millward Brown data from BPI Statistical Handbook 2007 and Music Weekly 2004-2006 data

Table 13: Number of Top 40 debuts in UK weekly album sales charts

Period	Week	2004	2005	2006	2007
1	1-6	7	20	10	13
2	7-10	13	13	11	15
3	11-14	21	19	27	30
4	15-18	15	16	18	18
5	19-22	19	23	17	32
6	23-26	23	23	25	27
7	27-30	13	12	10	20
8	31-34	7	13	12	11
9	35-38	22	18	22	25
10	39-42	31	28	23	36
11	43-46	38	34	33	36
12	47-52	20	17	25	26
Total		**229**	**236**	**233**	**289**
Average		**19**	**20**	**19**	**24**

Source: Compiled from data in Music Weekly 2004-2007

Although we have not been able to obtain the data necessary to calculate a sales-weighted measure of innovation – the proportion of sales derived from newly launched products in a given period – it has been possible to calculate a related measure that indicates new entry and churn amongst the bestselling titles: the more entry and churn, the more significant the level of soft innovation.

The data in Table 13 for the UK show that about 19 new album titles on average enter the charts each month. So, around half the top 40 titles will change each month and there could be complete churn of the top 40 on average every two months. Alternatively one may see that that about 230 (289 in 2007) new albums enter the charts for the first time each year (compared with 30,000 product launches). If there was a complete change of albums in the charts each month there would be 12 X 40 = 480 debuts recorded in a year. 230 debuts in a year thus means that almost half the top 40 will change on average each month. The greater number of debuts in 2007 is not however on its own convincing evidence that innovation is becoming more rapid.[55]

4.4.6 Technological Product and Process innovation

TPP innovation is also important in the music industry

Since the recorded music industry began in the 1880s, there have been many technological changes in products and processes. We have already discussed changes from vinyl to digital downloads. The changing nature of the media and recording technology as reflected in product quality, length of recording or ease of selection all affect customer demand for recorded music. However, just as such technological advances stimulated the demands for the music the soft innovations would also have stimulated demand for recording and reproduction hardware. TPP and soft innovations interact and interplay: neither the hardware nor software markets would have developed as they have without innovation in the other.

4.4.7 Recorded music: an overview

The overall picture of soft innovation in the music industry is similar to that seen in book publishing. There is very extensive soft innovation as seen in launch patterns, but many titles fail and few have significant sales. There is also a high rate of churn in the top titles. However, unlike books, there is no evidence that the rate of churn in music has increased significantly in recent years. It is however also an industry where new digital technologies are prominent in their impact and where there has been much product and process innovation over the last century.

4.5 Video games

4.5.1 Introduction

Video games are largely console-specific but software and hardware have improved over time

The video games industry[56] is similar to recorded music and books in that the extent of soft innovation can be measured by new title launches, but it differs in that many games are specific to a particular type of hardware or console. Although some titles are available on multiple platforms, Clements and Ohashi (2005) report that this is true for only 17 per cent of the titles in their sample. Converting a game from one system to another requires additional development time and cost, and contractual agreements with platform providers sometimes demand exclusivity to one game system.

Over time, the hardware upon which the games are played has improved (Playstation has been replaced by Playstation 2 and Playstation 3) and as it has done so the games themselves have been revamped, improved with new titles launched. There has also been a growth in games available for personal computers.[57]

The sector involves the platform developers, suppliers and manufacturers as well as games developers and publishers. Clements and Ohashi (2005) describe how games publishers finance games development, manage relations with hardware providers, and organise packaging and marketing. A software publisher may either develop games in-house or sub-contract game development to independent developers.

Platform providers also publish some software titles themselves, but these 'first-party' titles comprise a modest share of the software variety available for their own consoles. A new title for Microsoft's Xbox 360 console or Sony's PlayStation 3, both of which have high-definition graphics, can cost as much as $30 million (£21 million) to develop.[58] Independent publishers pay a royalty fee to a platform provider for every unit of a game title sold; such software licensing fees may be

55. Caves (2001) refers to the work of Petersen and Burger (1975) and Lopes (1992) to present data on the number of records and the number of performers making the weekly US Top Ten and the share of performers who are new, established or fading stars. These data do suggest that artist lifetimes at the top are getting shorter with US Top Ten sales by established performers declining.
56. Sunila Lobo, a WBS doctoral student, has made a major contribution to this section of the paper.
57. See Green *et al.* (2007) for a detailed discussion.
58. 'The Economist.' December 8 – 14 2007:75.

the primary source of revenue for hardware producers.

4.5.2 Market size

The video games industry is thriving

The video games industry today is dominated by three major hardware producers and platforms: Microsoft's Xbox 360, Nintendo's Wii and Sony's PlayStation 3 (PS3). These are 'seventh generation' video game consoles; four to six years usually elapses between each company's release of the next generation of console.

Data from ELSPA show that in 2006, all-format UK sales were £1.36 billion (with a further £0.94 billion of revenue attributed to sales of hardware such as consoles).[59] In total, 65.1 million games were sold.[60] Console games accounted for 75 per cent of software unit sales and 79 per cent of revenues. In 2006, the best-selling software format was the PlayStation 2, which also shipped more than 40 million consoles across Europe. In second place were games for the Nintendo DS, with Sony's PlayStation Portable at number three, followed by the Xbox 360, the Xbox, the Wii and the GameCube (ibid). PC titles showed sales increasing by seven per cent in 2006.

According to ELSPA, in the first 50 weeks of 2007, the total number of units sold was up 16.6 per cent on 2006, with their value up 25.3 per cent from £1.2 billion to £1.5 billion

4.5.3 Number of titles

Large numbers of new games are being launched on to the market

Clements and Ohashi's (2005) study of US console games developers from 1994-2002 estimates the number of console games on the market at 1,234 in 1994, 1,514 in 1999 and 1,945 in 2001. This suggests a proportionate increase between 1994 and 2001 of 58 per cent, or approximately 8 per cent per annum. ELSPA reports that during 2004, 827 computer and video games were published in the UK.[61] Such data suggest that there are large numbers of new games being launched – and high levels of soft innovation.

4.5.4 Patterns of success

There is a pattern of soft innovation very similar to that in books and recorded music

Although there may be many games in the market at any time – and many new games launched – different titles enjoy varying degrees of market success. Unlike books and music, sales patterns for software will reflect the console or hardware ownership patterns and changes therein in addition to games-related factors. This is the nature of two-sided markets with different platforms (Armstrong, 2006). Thus, if a new console becomes very successful, there is likely to be a higher demand for related software.

Once again, we see sales declining quite quickly as we move down the bestseller chart, and sales of a limited number of bestsellers provide a reasonably reliable indicator of what is happening in the whole market. Although it has not been possible to locate relevant supporting UK sales data (i.e. including number of units sold), some data relating to the Japanese market for the period from 2004 to 2007 have been located.[62] These data show that from November 26 – December 2, 2007, the bestselling title in Japan (Professor Layton and the Devil's Box) sold 293,897 copies, whereas the tenth best seller (Yu-Gi-Oh! World Championship 2008) sold only 34,620 copies.

For the UK, ELSPA data show sales patterns for bestselling video games. Most games appear to have short lives, but the picture can be variable. At one extreme 'Dr Kawashima's Brain Training: How Old Is Your Brain?', a Nintendo DS game, had been in the Top 10 for 80 weeks as of 15 December 2007, with an upgraded version on the Top 10 for 25 weeks. Its nearest rival, 'Fifa 08' (the latest instalment of Electronic Arts' football video game, released in the third quarter of 2007) had already been on the ELSPA Top 10 for 12 weeks. But only four of the Top 10 games had been in the charts for more than two months.

Table 14 presents data from ELSPA/Chart Track from 1995 to 2007 on the number of weeks for which titles have been at No 1 in the sales charts. 'Who Wants To Be A Millionaire' was No. 1 the longest, while most of the others lasted just ten weeks at the top.

Data for the top ten titles that made number 1 in 2006 are presented in Table 16 and for 2007 in Table 16.[63] Only 'Fifa 07' re-appears from 2006 in the 2007 Top Ten games. Jointly the tables indicate that between 2006 and 2007, the number of weeks at the top has halved from eight to four weeks. On average a Top 10 game spent 4.2 weeks at No.1 in 2006 compared with only 2.7 weeks in 2007 and an average of 11 weeks for all the top selling No. 1 games since 1995. This suggests a pattern of soft innovation similar to that seen with books.

59. Source: http://news.cnet.co.uk/gamesgear/0,39029682,49286924,00.htm (accessed on 19 December 2007 – article was posted on 15 Jan 2007 on the site).
60. Source: http://news.spong.com/article/14502
61. See www.elspa.com
62. The data are available at: http://forum.pcvsconsole.com/viewthread.php?tid=13452.
63. Source: ELSPA/Chart-Track.

Table 14: Entertainment software – weeks at No. 1 from 1995 until week 50, 2007

Title	Weeks at No. 1
Who Wants To Be A Millionaire	18
FIFA Soccer '96	11
FIFA – Road To The World Cup 98	11
Grand Theft Auto: Vice City	10
Need For Speed: Most Wanted	10
Tomb Raider	10
Need For Speed: Underground 2	10
FIFA 07	10
Medal Of Honor: Frontline	10
Pokemon Yellow	10
Average	**11**

Source: ELSPA/Chart Track

Table 15: Entertainment software – weeks at No.1 in 2006 , Top 10

Title	Weeks at No. 1
FIFA 07	8
FIFA World Cup Germany 2006	6
Grand Theft Auto: Liberty City Stories	5
Need For Speed: Most Wanted	5
Cars	5
Tomb Raider: Legend	3
Need For Speed: Carbon	3
FIFA Street 2	3
LEGO Star Wars Ii: The Original Trilogy	2
Hitman: Blood Money	2
Average	**4.2**

Source: ELSPA/Chart Track

Table 16: Entertainment software – weeks at No.1 in 2007, Top 10

Title	Weeks at No. 1
Spider-Man 3	4
Harry Potter & The Order Of The Phoenix	4
Transformers: The Game	3
Lost Planet: Extreme Condition	3
Forza Motorsport 2	3
FIFA 08	2
FIFA 07	2
Final Fantasy XII	2
Command & Conquer 3: Tiberium Wars	2
Bioshock	2
Average	**2.7**

Source: ELSPA/Chart Track

4.5.5 A sales-weighted innovation indicator

The share of the sales of the top bestselling titles that are attributable to recently launched titles is similar to that found in books

With books and recorded music, we have argued that a useful indicator of the rate of significant innovation is provided by looking at the share of the sales of the top bestselling titles that are attributable to recently launched titles. Although it has not been possible to locate UK sales data to produce such an index for video games, we have been able to examine data relating to the Japanese market for the period from November[64] 2004 to 2007.[65]

In this exercise[66] a title is defined as new if it has been on the bestseller list for four weeks or less and the index is calculated as the proportion of total weekly sales of the top ten titles that meet this criterion. Table 17 presents the results. The mean new title share of 70 per cent over the whole period is high[67] and illustrates a rate of innovation at least as high if not greater than that in books in the UK (where the equivalent statistic is 45 per cent).

64. Data was missing for July and August 2007, and there was only limited data for September, October and December 2007.
65. The data are available at: http://forum.pcvsconsole.com/viewthread.php?tid=13452.
66. The detailed data collection and estimation has been undertaken by Dania Nicolaou, a WBS doctoral student.
67. This rate does however vary significantly on a weekly basis over the time period for which data are available.

Table 17: Proportion of sales of Top 10 video game titles accounted for by titles in the Top 10 for less than four weeks, Japan

Year	Average (%)
2005	81
2006	56
2007	78
Maximum	100
Minimum	20
Mean	70

Source: Derived from data located at http://forum.pcvsconsole.com/viewthread.php?tid=13452

4.5.6 Technological Product and Process innovation

While the close relationship between the hardware and software market means that technological advances in hardware boost the demand for innovative software, the demand for superior games provides strong incentives for hardware producers to introduce console innovations. This is a very similar dynamic to that in recorded music.

4.5.7 Video games: an overview

So, the video games industry is a highly innovative soft innovator, launching numerous new titles each year. The life cycle of a new successful title is short, and there is evidence as with books, that life cycles are shortening over time.

While we have been unable to calculate a sales-weighted innovation measure for the UK, we have been able to do so for Japan. The data show that titles that have been listed for four weeks or less (new titles) account for 70 per cent of top ten sales. On any measure, this is a high rate of innovation.

68. For interest, Sedgwick (2002) provides some useful related observations on the history of blockbusters and also-rans in Hollywood movies. See also DeVany (2003).

4.6 Soft innovation in the creative industries: conclusions

This chapter has discussed soft innovation in three creative products. The measures of innovative activity have involved industry metrics relating to the number of titles (product variants) launched at different points in time. The results illustrated both the extent and nature of soft innovation.

Many new titles are launched in these industries each year, indicating high rates of soft innovation. Of the new products launched very few sell many copies. The most successful products sell in very large quantities but sales quickly decline with sales ranking.[68] There is evidence, at least for books and video games, that product life cycles are also becoming shorter and these markets exhibit greater and greater churn with more and more bestsellers each year.

We have proposed sales-weighted indicators of soft innovation. Our preferred measure shows the proportion of the sales in time t of the n bestselling titles that is due to those titles launched in the period $t - \tau$ where n and τ may be chosen as appropriate to the case. Illustrative calculations of this indicator for books in the UK and video games in Japan have been undertaken. Our preferred index shows high rates of soft innovation that are also getting faster in the case of books, although the available data cover too short a time period in the case of video games for strong conclusions to be drawn. It has also been possible to confirm high rates of soft innovation using various other indicators, although there is little evidence from the data gathered here that soft innovation in the recorded music industry is getting any faster.

Taken together, we conclude that the three industries studied reflect rates of innovation that are much greater than are common in studies of technological change. Many studies of innovation will talk of technological change at the rate of 2.5 per cent per annum across the economy as a whole (usually measured in labour productivity growth). These examples, where there is almost complete product churn in a couple of months, are in a different league. In the next chapter we see if this picture extends beyond the creative industries.

A lesson for further study of soft innovation in the creative industries is that although data on trademarks or design rights may be used to map innovation at the aggregate level, it may be particularly useful to use the numbers of product variant launches – or new titles – as a measure of the rate of innovation at the micro level. If possible, sales weighted data should be used.

Although we have not explored the causes of soft innovation in any depth, it is clear from our three examples that there are clear links between soft innovation and technological product and process innovations. The former affects the sales of the latter and the latter affects the sales of the former and the ability to deliver new products more quickly, more cheaply and of better quality.

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Part 5: Soft innovation outside the creative industries: the food and pharmaceuticals industries

5.1 Introduction

This Part considers soft innovation in those segments of the economy where innovation is traditionally most studied (those industries not regarded as specifically creative) by looking at innovation in the food and pharmaceutical industries.

Our interest is once again in the introduction of new product variants and product innovation. In these industries, however, not all new product variants that are launched will be soft innovations and many may in fact be technological innovations. A basic problem of analysis is that many soft innovations may have characteristics that reflect functional as well as aesthetic change. This requires us to consider where to draw the line in each case.

5.2 The food industry

5.2.1 Introduction[69]

Food producers in the 2007 UK R&D Scoreboard[70] register an R&D sales ratio of only 1.4 per cent on average, compared with the all industry estimate of 1.8 per cent: the industry is not high on the list of industries undertaking TPP innovation. However, soft innovation, with "soft" new products and product variants that offer aesthetic rather than functional change, appears frequent and widespread in the industry.

Food has both functional and aesthetic characteristics

In developed economies such as the UK, food is no longer considered to be just a means of survival or an antidote to hunger; it is a product that is to be enjoyed through its taste, appearance and smell. However, some functional characteristics remain important. For example, much current food-related debate relates to health. There are regular health scares about salmonella and e-coli, BSE, and foot and mouth disease. There is growing concern about obesity, particularly in young people and cholesterol levels in the adult population. More people are aware of food allergies and food intolerances. Consumers worry about the effects of using pesticides on food or genetically modified (GM) produce. In the context of breakfast cereals, Mintel (2006) reports that continuous product development between 2000 and 2005 in this industry was at least partly due to consumer demand for healthier products. And the impact of food on health is perhaps best considered a functional rather than an aesthetic characteristic of food.

Mintel (2006) also reports that product development at least partly reflects consumer demand for more premium, organic and adult-oriented products. Thus, the welfare of third world growers has been promoted through Fair Trade produce and there is now widespread acknowledgement of global warming, which has prompted a demand for locally produced food to reduce transportation over long distances. At the same time, organic food consumption has shifted from the margin to the mainstream. As a result, perception is amongst the important characteristics of food today. We see these as aesthetic characteristics of food.

There is horizontal and vertical innovation

The soft innovation that occurs in the food industry may be vertical or horizontal. Vertical product differentiation is often associated with marketing food of the same type into ranges of differing qualities. An example is

69. This section relies heavily upon work undertaken by a WBS doctoral student Diane Skinner.
70. See www.innovation.gov.uk/rd_scoreboard

Tesco's premium Finest range, which is sold at a higher price than the standard equivalent and Tesco's low-priced Value range, which is sold more cheaply. It has been found that premium product quality shows a statistically significant positive impact on success rate, implying that premium quality can be seen as a means of differentiation that may give the manufacturer a competitive advantage (McNamara et al, 2003:11).

Horizontal differentiation can be seen in Tesco's different food ranges: Healthy Living, Free-From, Wholefoods, Tesco Ingredients, Organic, Fairtrade, Low Carbohydrate, 'Fresh in the Capital', Tesco Kids products and Local.

A particular type of soft innovation observed in this industry is line extensions. Line extensions are defined by the American Marketing Association as:[71]

> *A new product marketed by an organization that already has at least one other product being sold in that product/market area. Line extensions are usually new flavors, sizes, models, applications, strengths, etc.*

The marketing literature documents many types of line extension, such as novel versus older line extensions, non-branded versus branded, slot-filler versus new-attribute expansions and co-branded versus self-branded ingredients. Generally such extensions involve small adaptations of an existing product.

5.2.2 Market size

Between 2002 and 2006, UK consumer expenditure on food products[72] grew by 15.8 per cent at current prices, to £54.6 billion.[73] Today, the food industry in most developed countries (see Winger and Wall, 2006) is represented by large numbers of producers, often small, who sell most of their produce to a small number of large supermarket retailers. There is competition not only for sales between retailers, but competition between food product suppliers to gain access to retail space. Supermarkets in the US and Europe may carry as many as 40,000 food and beverage stock keeping units (SKUs)[74] on their shelves while in Australia and New Zealand the supermarkets have around 12,000 to 25,000 lines. Winger and Wall (2006) cite that, of the average 40,000 SKUs in a US supermarket, the typical family gets 80-85 per cent of its needs from just 150 items, a supermarket shopping exercise taking on average 24 minutes.

5.2.3 Extent of innovation: new product launches

Publicly available data on bestselling products in the food industry are less accessible than for books, recorded music and video games, preventing a full analysis of soft innovation. A variety of other approaches are explored to illustrate the extent of soft innovation in this industry, building on the pattern of new product variant launches.

Much product innovation in this industry is soft innovation

The existing literature on new food products is informative. According to McNamara *et al.* (2003), thousands of new products (variants) are launched every year. Winger and Wall (2006) report about 18,000 "new" products offered to US supermarkets each year (in Australia and New Zealand, the equivalent is between 5,000 and 10,000) about 10 per cent of which are displayed on the shelves. New introductions to the shelves are almost always linked to the discontinuation of another product.

Winger and Wall (2006) also note that most of these products do not offer radical change. Consistent with this, Hoban's (1998) review of the evidence on the degree of novelty of products introduced in the US food market classifies only one in 100 or 200 products as genuinely new. Products with a strong franchise brand name ("equity transfer products") and line extensions are dominant. Siriwongwilaichat (2001) finds that of new food products launched in Thailand between 1996 and 1999, only 9 per cent could be classified as completely new to the market. Watzke and Saguy (2005) observe that out of 24,543 new products that Ernst & Young and AC Nielsen researched in the USA, only 539 were genuinely innovative.

The relative importance of line extensions and equity transfer products suggests that a large proportion of the innovation in the food industry is soft innovation.

Two good examples are chocolate and breakfast cereals. Cadbury continues to produce Cadbury Dairy Milk (now 100 years old), Flake, Creme Egg, Picnic, Crunchie, Double Decker, and Milk Tray, Fry's Chocolate Cream (launched in 1866) and Turkish Delight (launched in 1914). Clearly some of these are long-established brands. However, today's chocolate buyers are more knowledgeable and demanding and are purchasing high-cocoa-percentage bars, as well as chocolate sourced

71. See www.marketingpower.com/mg-dictionary-view2101.php. See also Bennett (ed.) (1995).
72. Defined to encompass: meat and meat products; fish and fish products; fruit and vegetables; dairy products, eggs, oils and fats; and bread, cakes, biscuits and cereals plus a variety of other food items that are not covered elsewhere, excluding sugar and sweet products, alcoholic drinks, and hot and cold beverages (including fruit juices, tea and coffee).
73. Source: http://www.researchandmarkets.com/reports/c81040
74. A stock keeping unit is a unique identifier for each distinct product and service that can be ordered from a supplier. Each different way of selling the same product, such as different quantities, or canned, glass and plastic bottles of a drink, is an SKU.

from specific parts of the world or single estate chocolate at the high end of the chocolate market (Financial Times, 2007).

In 2006, approximately 170 new organic chocolate products were launched globally and sales of Green & Black's, the UK's largest organic chocolate brand, rose 28 per cent to £36 million (Financial Times, 2007). In 2005, Cadbury acquired Green & Black's. In that year, Cadbury Schweppes' sales of Dairy Milk increased by 7 per cent whilst Green & Black sales increased by 49 per cent. The story of Green & Black's is also an interesting example of horizontal differentiation. Launched as a single high end product in 1991, the company now offers 16 different product variants. The launch of such chocolate and the brand proliferation are good examples of soft innovation and typical of what would be missed by concentrating solely upon TPP innovation.

The number of breakfast cereal lines has also expanded massively over the last decade. Today, one whole side of a multiple retailer supermarket aisle tends to be devoted to breakfast cereals. Kellogg's, for example, has expanded its range by providing both new products and variations on existing products. We have counted eighteen horizontally differentiated product derivatives currently available for some of Kellogg's most popular cereals. Similarly, the Weetabix range, produced by the Weetabix Food company now encompasses seven variations, including three in a Weetabix Disney range. Quaker Oats is still sold in its original form, together with an organic version, a real fruit version, a maple flavoured "real fruit and nut" version, and ten derivatives of Oatso Simple muesli. Such line extensions and marketing innovations are all part of soft innovation.

All this suggests that much product innovation in this industry is not about new products or processes; it is soft innovation, catering to people's different tastes and aesthetic preferences rather than offering different functionality.

Most product innovations are commercial failures

Echoing the creative industries, many studies of new product launches in the food industry suggest that most product innovations are commercial failures. For example, McNamara *et al.* (2003), citing Madakom (2001), note that a large proportion of the 32,478 new products introduced into the German food market in 2000 did not survive beyond the first year.

Although there is some evidence that truly innovative products are often more successful for a company (Stewart-Knox & Mitchell, 2003), Winger and Wall (2006) report various findings on failure rates from the literature (relating to different places and times) that reinforce the view that most new food products fail. They quote failure rates ranging from 48 per cent to 99 per cent.

5.2.4 Extent of innovation: trademarks

In the absence of more detailed data about the patterns of product innovation in this industry, some further information may be gained from trademark data. As argued in Part 3, trademarks may be counted to measure jointly both soft and TPP innovations. However in an industry with limited R&D, TPP innovations may be relatively few making trademark counts a reasonable indicator of soft innovation. Table 18 details the number of trademarks registered in the food industry for four countries during 2004 and 2005.

Soft innovation activity measured by trademarks registered is high

Of the total number of trademarks across all industrial sectors registered in 2005, those in the food industry represented 10 per cent, 3 per cent, 17 per cent and 8 per cent respectively for the UK, the US, Germany and Korea, indicating that when soft innovation is taken into account alongside TPP innovations, the food industry may well be one of the more innovative industries. Soft innovations are also likely to be particularly high in industries in NICE[75] Class 30 (see Table 18) in all four countries. Unfortunately, as these trademark data are available only for two years it is not possible to draw inferences on trend changes over time.

5.2.5 Technological Product and Process innovation

TPP innovation also matters

Soft innovation in this industry, as in the creative industries we study, may well partly depend on innovations in production and transportation processes. For example, freeze drying revolutionised the instant coffee market. New knowledge regarding ripening and storing technologies has facilitated an expansion in worldwide trade in fruit and vegetables. The growth of large supermarkets is at least in part based on IT advances in logistics, electronic funds transfer, refrigeration technology and plant breeding. The ability to reflect customer demands in new products owes much to

75. The NICE Classification consists of a classification of goods and services for the purposes of registering trademarks and service marks and is based on a multilateral treaty administered by WIPO called the Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks.

Table 18: Trademark registrations in the food industry

Food Classes	Trademark Registrations (2004 and 2005)							
	United Kingdom		United States		Germany		Republic Of Korea	
	2004	2005	2004	2005	2004	2005	2004	2005
29	1,111	1,090	2,256	2,546	3,456	3,657	2,517	3,215
30	1444	1374	3555	4134	4596	4851	3139	3551
31	484	444	1280	1342	1466	1611	980	1294
32	814	924	1157	1429	2862	3161	1265	1646
Total	**3853**	**3833**	**8248**	**9451**	**12380**	**13280**	**7901**	**9706**

Key to classes (NICE classification)

Class	Description
29	Meat, fish, poultry and game; meat extracts; preserved, dried and cooked fruits and vegetables; jellies, jams, compotes; eggs, milk and milk products; edible oils and fats
30	Coffee, tea, cocoa, sugar, rice, tapioca, sago, artificial coffee; flour and preparations made from cereals, bread, pastry and confectionery, ices; honey, treacle; yeast, baking-powder; salt, mustard; vinegar, sauces (condiments); spices; ice.
31	Agricultural, horticultural and forestry products and grains not included in other classes; live animals; fresh fruits and vegetables; seeds, natural plants and flowers; foodstuffs for animals, malt.
32	Beers; mineral and aerated waters and other non-alcoholic drinks; fruit drinks and fruit juices; syrups and other preparations for making beverages.

Source: WIPO website; see http://www.wipo.int/ipstats/en/statistics/marks/, accessed 17/12/07

changes in methods of data capture reflecting consumer expenditure patterns.

5.2.6 The food industry: an overview

Judging innovativeness in the food industry solely on the basis of R&D spending, which mainly reflects TPP innovation, does not provide a true picture of an industry that is continually launching new product variants and changing its product ranges to meet consumer desires and needs. We have argued that the actual pattern of innovation may be better reflected in trademark statistics, which, in conjunction with the literature on new product launch patterns, suggest that: (i) product innovation is extensive in the food industry; and (ii) that many of the innovations may be soft in nature. Such soft innovation is also partly dependent on TPP innovations.

However, most new products fail, so the extent of significant innovation may be much less than the total launch numbers would suggest. According to the Winger and Wall (2006) numbers cited above, a US supermarket would carry about 40,000 different products or variations on the same product and replace about 1,800 of these each year – a rate of 4.5 per cent per annum. Of these new products, only 42 per cent appear to be still "alive" after 39 weeks. Using the 39 weeks life as an (arbitrary) indicator of significance suggests

that the rate of significant product launch may be around 1.9 per cent per annum. This is still extensive, but of course far less than any estimates seen in the three creative industries studied.

5.3 Pharmaceuticals

5.3.1 Introduction

The pharmaceuticals industry[76] is always considered to be amongst the most active of industries as measured by its R&D spend and patents registered. The 2007 R&D Scoreboard[77] reports R&D spending of £47 billion in 2006 in the UK industry (compared with £2.5 billion in the food industry). The industry is considered here precisely for that reason, for even with such apparently extensive product and process innovation it is still possible to identify much soft innovation.

The nature of soft innovation in pharmaceuticals

The nature of soft innovation in pharmaceuticals merits some initial discussion. A quick glance at the over-the-counter painkiller shelves in the supermarkets reveals that there are many variants of particular pharmaceuticals. Take aspirin: it may be branded or generic; there are soluble and children's versions; it may come in low or high does as tablets, capsules or caplets; it may be mixed with other painkillers. That there is such variety is an indicator of soft innovation insofar as these products are differentiated, at least partly, by aesthetic characteristics.

As we have seen, line extensions may be considered as soft innovations. In this industry, line extensions can be a new formulation of an existing product or a new modification of an existing molecular entity (Hong *et al.*, 2005).

Another area meriting consideration is the launch of generic versions of existing drugs. A generic drug is a bioequivalent[78] product of the original product. Although the functionality of the generic is essentially the same at the therapeutic level,[79] generic versions of original products can differ along several dimensions: shape; release mechanism; labelling; scoring;[80] and recipients.[81] If the launch of generics is considered as soft innovation these dimensions (plus brand image) could serve as the categorisations by which the new product differs.

This argument is contentious. It is usually argued that a generic product is an imitation and not an innovation. This is correct if one is measuring innovation by functionality. But a generic will differ from the original in some way even if only in terms of product name, brand (or no brand) or packaging. These are aesthetic differences.

One might expect the market impact of the generic in terms of sales relative to the original to be large[82] (because one expects it to be priced lower than the original) and thus, judged by market significance, a generic product as an aesthetic innovation may be considered important.

5.3.2 Market size

The pharmaceuticals market is large and international

Datamonitor (2004)[83] indicates that in 2003, the global pharmaceuticals market grew by 7.5 per cent to a value of $462.3 billion, and forecast a value of $647.9 billion in 2008, an increase of 40.1 per cent since 2003. Cardiovascular drugs make up the largest sector, accounting for 19.5 per cent of the market's value. The US market dominates global pharmaceuticals sales, generating 47 per cent of the revenue. The global biotechnology industry grew by 13.7 per cent in 2003 to reach a value of $102 billion. North America continues to dominate with nearly 48 per cent of the global biotech industry revenue coming from this region. The industry is made up of a limited number of large multinational companies, reflecting the huge costs of developing drugs.

5.3.3 Extent of innovation: new product launches

There are extensive new pharmaceutical product launches

Following the previous examples, an analysis of product launch patterns is a useful means to obtain a measure of soft innovation. Roberts (1999) takes a market-based approach to innovation in pharmaceuticals and explores product innovations according to year of introduction, annual product sales, therapeutic market membership and total therapeutic market sales in the US for the period 1977-1993 using data supplied by Intercontinental Medical Statistics America (IMS).

Roberts' sample contains both TPP innovations and soft innovations. To keep the analysis manageable, Roberts (1999) only considers products with sales in excess of $1 million (£704,000) in any one year. He finds 4,914 new products meet his sampling criterion.

76. Much of the work on this section of the report has been undertaken by a WBS doctoral student, Sotiris Rompas.
77. See www.innovation.gov.uk/rd_scoreboard/
78. Two drugs are considered pharmaceutical equivalents (bioequivalents) when: (a) they contain the same active ingredients; (b) they are of the same dosage form and route of administration; and (c) they are identical in strength and concentration.
79. Interestingly, the generic may be a functional innovation locally, i.e. for the producer (a product with different functionality from previous products produced) but a soft innovation for the market. This chapter takes the market perspective.
80. A score is a debossed line running across the planar surface of the tablet that can be used to facilitate the breaking of the tablet into fractions when less than a full tablet is required for a dose.
81. A recipient is an inactive substance used as a carrier for the active ingredients of a medication.
82. Kanavos *et al.* (2008) provide some detail on off-patent drugs but argue that despite recent emphasis upon generics there is little knowledge on the mechanisms driving generic competition, the impact of regulation upon generic competition and the extent to which generics deliver savings.
83. The Datamonitor report was obtained freely through EBSCOhost and Business Source Premier (see www.ebscohost.com)

Roberts quotes Ali (1994) who says roughly 10 per cent of all new products introduced to the market may be considered new to the world. Thus, if as an extreme, "new to the world" is taken to mean that they offer different functionality, this still allows that 90 per cent of these 4,914 new products may be counted as soft innovation. Of these 4,914 products, 1,070 are for at least one year in the top 40 by sales. Of these, only 13.5 per cent are significant in terms of generating a market share greater than a chosen threshold of 15.6 per cent. Overall, therefore, Roberts work indicates that as we have seen elsewhere: (i) there are many new soft innovations being introduced; and (ii) that only small numbers of these (and TPP innovations) have significant market impact.

Hong *et al.* (2005) provide some insight into line extensions in pharmaceuticals.[84] The study explores orally administered, non-antibiotic, single-pharmaceutical ingredient brand name drugs. Twenty-seven brand name prescription drugs that lost patent protection between 1987 and 1992 were selected for study. Of those, nine lost their patents in 1987, five in 1988, three in 1989, and ten in the years 1990 to 1992. All but one of the brand name drugs were indicated for chronic diseases. Overall, product extension was observed in eight of the 27 brand-name drugs, some with more than one extension. Of nine extensions, four involved the drug's formulation being modified. All the formulation modifications involved extended-release or delayed-release dosage forms. In other words, soft innovation through line extension was widespread.

Prasnikar and Skerlj (2006) study generic pharmaceutical companies that are also manufacturers and have a research and development department in Central and Eastern Europe. Of 972 projects and products identified, 34 were at the pre-launch stage in 2002. Of these 6 per cent were line extensions but 59 per cent were existing products being offered to new markets. Only 35 per cent involved improved functionality. Again, the indication is that soft innovation is widespread.

5.3.4 Extent of innovation: FDA review types

FDA review data indicate widespread soft innovation in pharmaceuticals

Another potential indicator of soft innovation comes from a headcount of the number of drugs submitted in the US to the Food and Drug Administration (FDA) for review each year. There are three types of review, Original New Drug Applications (ONDA), Abbreviated New Drug Applications (ANDA) and Supplemental New Drug Applications (SNDA):

- ONDA encompasses application for approval for new chemical entities and as such primarily indicates product or process innovation.

- ANDA encompasses applications for generic versions of patented ethical (prescription) drugs. More specifically, an ANDA contains data that provides for the review and ultimate approval of a generic drug product. Once approved, an applicant may manufacture and market the generic drug product. It has been argued above that new generics may be considered as soft innovation.[85]

- The FDA defines SNDA as changes to drugs or their labels after they have been approved. Similarly, to change a label, market a new dosage or strength of a drug, or to change the way it manufactures a drug, a company must submit a supplemental new drug application (SNDA). SNDAs may capture particular aspects of soft innovation such as line extensions, packaging and labelling.

Data from the Drugs@FDA database[86] for the eleven-month period ending November 2007, indicate approval of 71 Original New Drug Applications, 421 abbreviated new drug applications and 1013 supplemental new drug applications. The size of the latter two categories relative to the former is consistent with the high levels of soft innovation in the industry.

Tables 19 and 20 provide more detail on ONDA and SNDA applications. Very few new molecular entities are approved: only 15 of 71 ONDA drug approvals fall into this category. Labelling revision dominates the SNDA list. All this suggests that innovations in the pharmaceutical industry are much more likely to be at the soft rather than functional end of the spectrum. If not purely aesthetic, new product variants may also often differ partly on aesthetic grounds and partly on functional grounds.

These data indicate that there may well be large numbers of soft innovations in the pharmaceutical industry. Table 21 provides data on the shares of generic medicines in Europe. Although there are considerable differences across countries, these data also clearly indicate that generics have an important

84. A line extension is defined in this study of US pharmaceuticals as another product that a company introduces within the same market as its existing product, being either a new formulation or a new molecular entity within the same Hierarchical Ingredient Code (HIC) drug category. However, if the new formulation is a tablet or a capsule of an existing product, it is not defined as a line extension.
85. Generic drug applications are 'abbreviated' because they don't usually include pre-clinical (animal) and clinical (human) data to establish safety and effectiveness. Instead, a generic applicant must scientifically demonstrate that its product is bioequivalent (i.e. performs in the same manner as the original drug).
86. See www.fda.gov/cder/drugsatfda/datafiles/

Table 19: ONDA drugs approvals, 01/2007-11/2007

Chemical Types	Number
New Molecular Entity	15
New ester, new salt or other non-covalent derivative	2
New formulation	26
New combination	4
New manufacturer	13
New indication	9
Drug already marketed	-
OTC switch	2
Total	**71**

Source: Based on Drugs@FDA database

Table 20: SNDA drugs approvals, 01/2007-11/2007

Approval Type	Number
Accelerated approval	3
Control Supplement	28
Efficacy Supplement	28
Formulation Revision	33
Labelling Revision	754
Manufacturing Change	15
New dosage regimen	18
New Indication	31
Administration	1
OTC Labelling	3
Package Change	34
Patient population altered	23
Supplement	42
Total	**1,013**

Source: Based on Drugs@FDA database

Table 21: Market shares of generic medicines in Europe, per cent

Country	By Value			By Volume		
	1994	1999	2004	1994	1999	2004
Denmark	39.3	30.3	29.7	61.3	59.0	69.7
Netherlands	8.5	12.0	17.7	19.9	33.0	44.3
Poland	66.1	59.2	60.5	90.8	84.3	84.7
UK	8.6	11.8	20.1			
Austria	5.5	5.7	8.8	9.2	11.0	15.8
Belgium	0.8	1.2	4.8	2.2	3.1	8.0
France	0.9	1.2	6.6	1.8	2.2	10.4
Italy	0.9	0.7	2.5	1.4	1.2	4.5
Portugal	0.5	0.5	8.6	0.8	0.9	7.2
Spain	1.7	1.9	5.0	2.0	2.5	8.1

Source: Simeons and De Costar (2006)

market impact and thus that at least some past soft innovations have been significant on these terms. The data also show that, in most countries, the importance of generics is increasing, which is consistent with (though not definitive evidence that) soft innovation is becoming more important over time.

5.3.5 Technological Product and Process innovation

TPP innovation also matters in pharmaceuticals

The pharmaceutical industry makes significant use of patents to protect IP, and it is the industry where patents are considered most effective. It is also an industry facing considerable regulation. In the circumstances, soft innovation – especially the introduction of generic variants – may often lag well behind TPP innovation. Although product variants may well be put on the market and appeal through differences in taste, appearance or packaging, the intellectual property regime may delay the process considerably.

5.3.6 Pharmaceuticals: an overview

We have looked at soft innovation in pharmaceuticals because it is an industry where TPP innovation is usually considered to be particularly strong: R&D spending is high (in total and as a percentage of overall sales); and patents are widely used. Even so, we have seen much soft innovative activity that would not be considered in traditional definitions of innovation.

Indeed, there is evidence to suggest that soft innovation is much more common than TPP innovation in this industry. However, as with other industries, only a small proportion of these innovations go on to be market successes and may be considered 'significant'.

5.4 Soft innovation outside the creative industries: an overview

It is more difficult to isolate and measure soft innovation outside the creative sector than in the creative industries. But in this chapter, we have shown that in two very different industries, food and pharmaceuticals, there is considerable evidence for widespread soft innovation, both horizontally and vertically differentiated. We have argued that line extensions and new generic products, as well as marketing innovations, may be considered as part of such innovation; and that some new product variants may offer a mix of both aesthetic and functional innovation.

The two industries we explore are chosen as they are traditionally viewed respectively as innovative (pharmaceuticals) and non-innovative (food). But in each case there is considerable soft innovation that is hidden from standard metrics of innovation, which appear to considerably downplay the amount of innovation in such industries. This echoes the finding in Part 3 that when trademarks are counted alongside patents and R&D, there is a considerable change in the overall picture of innovative activity observed (though again not all soft innovations are significant in economic terms).

One difference compared with the creative industries is that soft innovation here appears to be of a lower order of magnitude. Although it is not our task in these chapters to explain the causes of soft innovation, TPP innovation in both creative and non-creative sectors may provide some 'supply-side' explanation for the extent and timing of some soft innovations. For example, TPP innovations in pharmaceuticals may well provide opportunities for new line extensions and soft innovation; and new food technologies may have also allowed further soft innovation.

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Part 6: Some theoretical observations

6.1 Introduction

Having discussed the nature of soft innovation and illustrated its widespread occurrence, we now explore its determinants and impacts, partly to understand the phenomenon better, but also to consider the desirability of government intervention. We do so from a position that considers that soft innovation is an economic phenomenon that can be analysed using the standard tools of economics, though a complete theoretical treatment of the economics of soft innovation is left for Stoneman (2010). Here, we limit the discussion to some relevant observations arising from theory.

Theoretical analysis appropriate to soft innovation differs from that for TPP innovation

An obvious place to start is to consider the extent to which some of the basic foundations of the economics literature on technological product and process innovations can be applied to the study of soft innovation. We argue, in general, that basic assumptions like the profit motive can be applied to soft innovation, and that issues such as uncertainty and creative destruction are equally important in the two different contexts.

But there are limitations on the extent to which the basic approach can be applied. A particular aspect of soft innovation is the product differentiation perspective (see Tirole, 1988), which requires some different approaches in modelling demand and supply, as well as welfare issues. In fact, traditionally there has only been a limited application of product differentiation models to the understanding of innovation, especially horizontal innovation (perhaps because such differentiation is excluded by OECD definitions).

As well as providing insights to the drivers and impacts of soft innovation, theoretical analysis also helps us to see whether or not in a free market the soft innovation process generates a welfare-optimal outcome and if not whether policy intervention can improve innovation outcomes.

6.2. The supply of soft innovations

Many factors affect the supply of soft innovations

The standard theory of TPP innovation identifies market structures (competitiveness of input and product markets); the elasticity of product demand (sensitivity of demand to changes in prices and income); and the elasticity of costs with respect to R&D (sensitivity of production costs to R&D) as prime determinants of R&D spending, and thus the rate of product or process improvement. Models of horizontal and vertical product differentiation identify the same drivers but also reflect consumer preferences.

The supply of soft innovations may not be welfare-optimal

A major preoccupation of the TPP literature is whether expenditure on R&D maximises individual and social welfare (see Stoneman, 1995). With soft innovation, the question is whether in a free market there will be too much or too little incentive to variety from this perspective (see Dixit and Stiglitz, 1977). The literature on TPP innovation indicates that one should consider common pool issues (also known as the tragedy of the commons),

monopoly power and creative destruction. With soft innovation, even putting aside the extent to which such innovations may be copied ('appropriability,' which is considered elsewhere) different models have different normative predictions. In some scenarios expenditure on developing variety may be too low to maximise social welfare. In others it may be too great. Lancaster's (1990) survey remains definitive. This argues that:

> *The fundamental structure of all optimal variety problems, for the individual firm as well as society, is the interplay of two elements in the economy – the existence of a gain from variety and the existence of scale economies of some kind. If there are no economies of scale associated with individual product variants (in distribution as well as in production), then it is optimal to custom produce to everyone's chosen specification. If there is no gain from variety and there are scale economies, then it is clearly optimal to produce only a single variant if those economies are unlimited, or only such variety as uses scale economies to the limit (all products at minimum average cost output). Most cases involve a balance of some variety against some scale economies, the solution depending on the preference properties of consumers, the scale properties in production and distribution, and the way in which the social welfare criterion is derived from individual preferences. Different criteria and assumptions can lead to quite different conclusions.*

6.3 The demand for and diffusion of soft innovations

Soft innovations – even in lower quality products – may increase demand

There is an existing literature that looks at the diffusion of new technologies (see, for example, Geroski, 2000), but very little that picks up the issue of product differentiation that is the defining characteristic of soft innovation. Extending the analysis to soft innovation shows that the introduction of new horizontal product variants can stimulate the demand for a product class as a whole, even if it reduces the demand for existing variants. With vertically differentiated innovations it can be shown, for example, that the introduction of new products at the right price can extend ownership of a new technology, and that even lower quality (but proportionately lower priced) innovation variants may also have this effect.

We have seen that some product life cycles, such as for books, are characterised by early sales of a title being large with demand quickly exhausted (especially if no price reductions are expected): in such markets, a continuous flow of new titles is required to maintain that market. For other types of technology, involving hardware and software, such as video games, the interaction between soft innovation and the demand for hardware is particularly important. In these markets, the feedback will be two-way: hardware innovation may change demand for soft innovation.

6.4 Risk and uncertainty

Uncertainty is an important influence on patterns of soft innovation

Uncertainty is fundamental to all innovation processes. The costs of product development and launch are incurred upfront but profits will only flow if the product is successful in the market and can generate revenues greater than those costs. The revenues cannot be known with certainty in advance. Soft innovations are no different in this regard.

Uncertainty may itself be the reason for extensive new launch proliferation in some markets

We have seen that certain markets are characterised by many product launches. Theory suggests that the cheaper it is to launch a new variety – and the bigger the prize to be won in the event the product is successful with consumers – the more varieties that will be launched.

Proliferation of variety is less likely if promotional activities increase the probability that innovators can win the prize, or if the effectiveness of promotional activities declines with the number of products launched (as may be the case if, for example, 'too many' varieties complicate informed decision-making by consumers).

Conceivably, firms may also launch a large number of varieties to reduce their risks ('letting a thousand flowers bloom').

Uncertainty may generate welfare sub-optimal innovation

The literature on TPP innovation suggests that market failures in the provision of

insurance and of risk capital may justify some form of state intervention. To the extent this understanding has been taken by policymakers and used to justify certain policy measures, this raises the question of whether such policies should be extended to soft innovation.

6.5 Conclusions

This Part has provided a brief overview of the insights and implications that are derived from theoretical models of soft innovation. As well as identifying some of the drivers of soft innovation, theory also suggests that free markets will not always generate the optimal variety or speed of diffusion – even before we consider issues of appropriability and intellectual property (which are considered in the next Part).

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Part 7: Soft innovation, intellectual property rights, competition and welfare

7. 1 Introduction

With the advent of digitisation, the widespread use of the internet and the availability of various new storage and reproduction media, the problems of free and often unauthorised copying of materials has become an issue of major concern.[87] In such a context intellectual property (IP) rights are widely seen as important in determination of the incentives for innovation.

Unlike many technological innovations, soft innovations cannot generally be patented. Use has to be made of other IP mechanisms instead which operate differently and protect different product characteristics.[88] There is a considerable literature on IP[89] but we explore three main interrelated strands. The first concerns the institutional arrangements needed when non-market institutions are required to strengthen IP; the second relates to the effectiveness of such institutions in improving the innovation process and whether they improve economic welfare; and the third concerns the impact of different product market structures (e.g. monopoly vs. competition) on innovation in markets.

Non-rivalry and non-excludability for a product are basic characteristics that determine the need for protection

A major conceptual advance made by Arrow (1962) was to propose that innovation should be considered as similar to knowledge or information. Arrow's view was that as knowledge is expensive to produce but cheap to reproduce, in the absence of property rights, it will be under-supplied in a free market.[90] So, for example, unauthorised free downloads of music will deter further title launches.

'Rivalry' concerns the impact of one person's ownership of a product on another's enjoyment of that product. Defence services once provided to a nation for one can be enjoyed by all with no deterioration and are 'non-rivalrous'. But, more commonly one consumer's use of most consumer products prevents their use by another and such products are thus 'rivalrous'. On one level, information tends to be non-rivalrous in that one person having a piece of information does not preclude others from doing so, but the information may be economically rivalrous as its value may decline as others acquire it. A useful distinction is between rivalry in consumption and in production. A piece of music may be non-rivalrous in consumption in that my enjoying it does not affect your enjoying it: however, if one company were to compete with another in offering music concerts then this may well affect their individual returns.

The extent to which a product is 'excludable' reflects the ease with which a product owner or supplier can limit or control ownership by others. Thus defence services are non-excludable. Private non-durable consumer goods are excludable. If a product or service is non-excludable then the provider will be unable to obtain any of the social benefits from providing that product or service, giving rise to market failure. If information is not excludable, then there may be under-investment in innovation.

Innovation is generally rivalrous in production but without special institutional arrangements, does not offer complete excludability. It is rivalrous because the returns to an innovating firm will depend upon whether the innovation is copied (as a result of which an innovator might face competition and lower returns).

87. For example, for a sample of US undergraduates, Rob and Waldfogel (2007) estimate that unpaid consumption makes up 5.2 percent of all movie viewing and reduces paid consumption by 3.5 per cent.
88. The stance taken here very much reflects the UK institutions where non-industrial and soft innovations cannot be patented. In the US however there are utility and design patents. In general terms, a 'utility patent' protects the way an article is used and works (35 U.S.C. 101), while a 'design patent' protects the way an article looks (35 U.S.C. 171). Both design and utility patents may be obtained on an article if invention resides both in its utility and ornamental appearance. A utility patent has a term of 20 years (if renewal fees are paid) whereas a design patent has a term of 14 years without renewal fees. The design patents match UK and European design rights.
89. A good overview is the American Bar Association (2007).
90. A useful review of this appropriability issue is to be found in Winter (2006).

The degree of excludability depends upon the nature of the innovation itself and other factors. For example, it might be that excludability can be produced through secrecy, information sharing arrangements, control of strategic resources, use of specialised knowledge, threats, and learning by doing (see Geroski, 1995).

There are four main IP instruments

There are four main institutional arrangements that reinforce IP: patents, which protect the technical and functional aspects of products and processes; copyright, which protects material such as literature, art, music, sound recordings, films and broadcasts; design rights (or design patents), which protect the visual appearance or eye appeal of products; and trademarks, which protect signs that can distinguish the goods and services of one trader from those of another. Each has its own particular modus operandi.

Formal IP instruments are not widely used

Pitkethly (2007) reports the results of a survey of IP awareness and use in 1,700 UK firms in a range of sectors. Firms were asked to rank various methods of protecting innovations, from unimportant to essential. The percentage of respondents rating different mechanisms as essential is reported in Table 22.

Informal protective mechanisms such as confidentiality agreements or secrecy are often seen as more important than patents and other formal rights.[91] Of the formal IPR mechanisms, copyright is considered most important and design rights the least important, while patents and trademarks rank equally in the middle. But the proportion of firms considering formal IPR arrangements as essential is not large. Pitkethly (2007) reports that these data correlate well (R^2 = 0.75) with the findings of the UK Innovation Survey, and are broadly similar to findings regarding the relative effectiveness of IPRs, lead-time and secrecy by Levin *et al.* (1987).

Table 23 presents preliminary findings from the UK Innovation Survey 2007. These show even less value placed in formal IP mechanisms than Pitkethly reports.

A basic and important difference between formal and informal arrangements is that the former usually require the knowledge that is to be protected to be made public. Thus to obtain a patent, an inventor has to make the knowledge for which the patent is sought known in the patent application. This requirement yields two important social benefits: (i) it prevents resources being wasted in rediscovering that which has already been discovered; and (ii) it redefines the knowledge baseline for any future research in the field, enabling others to stand on the shoulders of previous innovations. These social benefits are not available if protection is obtained through informal methods such as secrecy, so – from the point of view of social welfare – they may be less desirable.

91. Eurostat reports actual usage in the UK: in 2000, 12.7 per cent of firms applied for a patent, 32.9 per cent registered a trademark, 22.7 per cent registered an industrial design and 31.1 per cent claimed copyright. (Source: Eurostat – Community Innovation Statistics from CIS 3; see www.epp.eurostat.ec.europa.eu/pls/portal/url).

Table 22: Percentage of respondents rating method of protecting innovations as 'essential'

No. Employees	0-9	10-49	50-249	250+	10-249	10+	Total
1. Patents	13.2	13.1	10.5	18.4	12.7	12.9	13.2
2. Trademarks	12.8	14.8	20.6	32.8	15.7	16.3	13.2
3. Copyright	22.5	16.3	16.5	20.5	16.3	16.4	21.9
4. Registered Designs	10.1	11.0	6.5	9.2	10.3	10.2	10.1
5. Confidentiality agreements	26.6	29.6	29.7	40.9	29.6	30.0	26.9
6. Secrecy	18.9	21.5	18.0	33.4	21.0	21.4	19.2
7. Complexity of Design	7.3	5.3	5.9	9.1	5.4	5.5	7.2
8. Lead time over competitors	14.3	18.2	17.4	21.2	18.1	18.2	14.8

Source: Pitkethly (2007)

Table 23: Percentage of respondents rating method of protecting innovations as of high importance.

No. Employees	10-250	250+	Total
1. Patents	6	15	6
2. Trademarks	8	19	8
3. Copyright	8	14	8
4. Registered Designs	5	14	6
5. Confidentiality agreements	12	26	13
6. Secrecy	8	17	9
7. Complexity of Design	4	9	5
8. Lead time over competitors	10	17	10

Source: Robson and Haigh (2008)

7.2 The patent system

Soft innovations cannot be patented
A patent protects new inventions and covers how things work, what they do, how they do it, what they are made of and how they are made. It gives the owner the right to prevent others from making, using, importing or selling the invention without permission.

To be granted a patent an invention must be new, involving an inventive step that is not obvious to someone with knowledge and experience in the subject, and it must be capable of being made or used in some kind of industry. It must not be a scientific or mathematical discovery, theory or method; a literary, dramatic, musical or artistic work; a way of performing a mental act, playing a game or doing business; the presentation of information or certain type of computer programme; an animal or plant variety; a method of medical treatment or diagnosis; or against public policy or morality. Most, if not all, soft innovations fall outside these restrictions and therefore are not patentable.

Despite soft innovations not being patentable, it is worth spending some time exploring the literature on patents as a means by which one can get a grip on the conceptual issues relating to other IPR instruments.

Once granted a patent, the holder has the right to determine access to the knowledge embodied in the patent and charge licence fees for use of that knowledge. If granted, the patent may be renewed every year after the fifth year and may then provide up to 20 years' protection. If the holder becomes aware that those rights are being infringed, recourse is to the courts which may end the infringements and award damages.

Within the EU, firms may apply either for national or European patents, the latter providing Community-wide protection, the former only national protection. In 2005, there were 128,679 national applications for European patents, the greatest number coming from the USA (32,738), followed by Germany (23,789) and Japan (21,461), while the UK only put in 4,649 applications.

A free market may support too little innovation from a welfare point of view
Assume that an inventor develops a technology that enables a new (vertically differentiated) product to be produced and launched on the market. Assume further that it is a drastic innovation, in that any prior offering to the market is no longer offered.[92] Figure 1 depicts a conventional demand curve, AU, which shows the demand associated for the product at different prices. The industry marginal revenue curve, AV, is also shown – that is, how sales revenue for an additional unit of production varies with the level of output. A simple production technology is assumed where producer costs per unit of output are such that

92. This requires that the demand curve for the old product in the presence of the new product priced at marginal revenue (the monopoly price) is such that even priced at marginal cost demand will be zero.

the marginal cost of production, MC, equals the average cost, c.

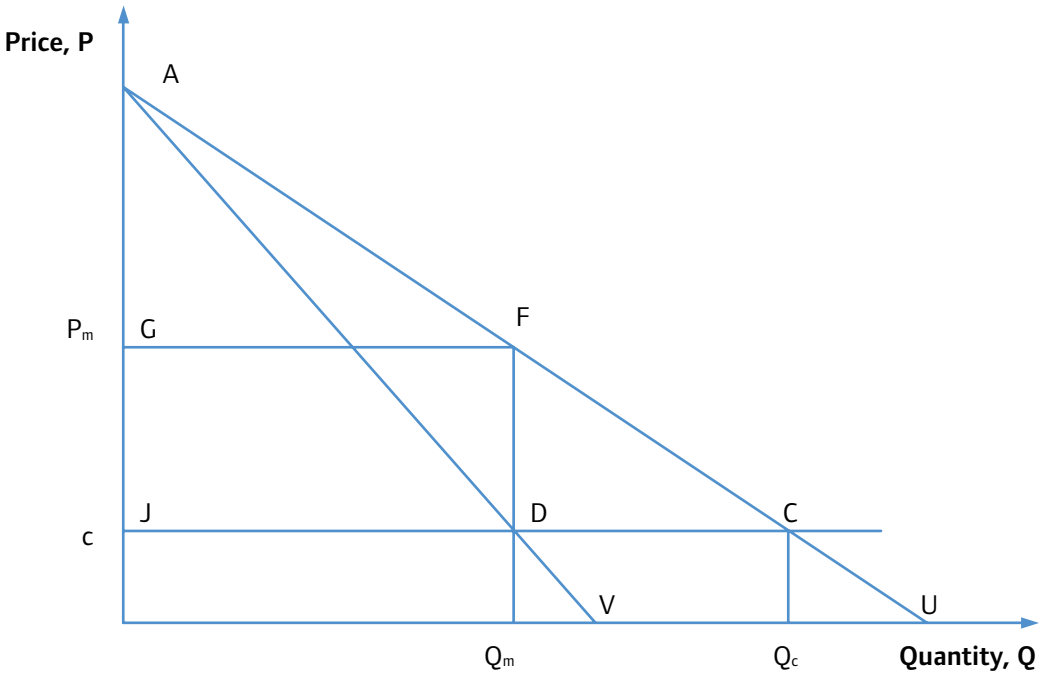
The static social welfare from the product innovation (before taking account of any losses from the previous technology) generated by the new technology is equal to the sum of what economists call the consumer and producer surplus (profits), the triangle ACJ. This sum is maximized if price equals marginal cost, when output Q = Qc.

This welfare argument is sometimes used to justify free downloads or unrestricted copying: the marginal cost of copying is close to zero, the argument goes, so the optimal price should be zero too. However, if price does equal the marginal costs of production, then all the welfare gain is received by consumers: producer surplus (profits) will be zero, removing the incentive for firms to innovate. Economists call this "dynamic" inefficiency.

If the new technology is excludable, then the inventor will have monopoly power over the knowledge required to supply the new product. With such monopoly power, the inventor earns monopoly rents by pricing in excess of marginal cost, price will equal Pm > c and output will be Qm < Qc. Consumer surplus will in this case be given by the triangle AFG, producer surplus by the area GFJD, and the area FDC is known as the monopoly welfare loss. Note that compared with the static welfare optimum, profits are now positive, but consumer welfare and overall welfare are reduced. The exclusivity enables the inventor to make supernormal profits. Even with excludability, however, not all the social benefit payoffs can be appropriated by the owner of the technology (i.e. there is still a gain in consumer surplus) and as such in a given period the private benefit (producer surplus) will be less than the social benefit, and the private benefit realised by the innovator is less than the potential social benefit of the technology (ACJ).

If the new technology is not excludable, then other firms will copy the innovator and supply the product to the market (or copy it without payment). As the number of suppliers increases, the price will fall and output increase. As this happens, the profit to the innovator will decline – the innovation is rivalrous – until, at the limit, price equals marginal cost, profits are zero and the static welfare optimum is reached. Excludability thus allows the originator or owner of an innovation to make profits from the innovation. In its absence there may be little private payoff or incentive to innovate. However, the provision of these incentives incurs a cost in

Figure 1: The trade-off between static and dynamic efficiency



the monopoly welfare loss that results from exercising excludability.

In the absence of excludability, a patent theoretically enables its owner to determine access to the knowledge embodied in the patent and charge licence fees for use of that knowledge. After a patent has expired, one expects the free market solution to rule (without excludability, yielding the welfare optimum). While the patent restricts innovation, the best strategy for the patent holder is to charge a royalty on each unit of the new product sold (by imitators) equal to Pm – c, at which royalty rate the annual income of the patent holder is maximised and equal to monopoly profits. This outcome replicates what would found in a market with excludable innovation.

Patents are thus a means by which many of the "externalities" arising from R&D may be market-intermediated and a return by the patent holder can be made for inventive efforts. But there is a cost which is the monopoly welfare loss that derives from the monopoly power granted. This cost arises because policies that provide property rights in knowledge to the inventor enable that inventor to receive a return on investment via mark ups of price over cost which distorts sales downward from the optimum level that would otherwise occur if the good were sold at marginal cost.[93]

But there may also be forces acting to produce too much innovation in a free market

The literature assumes that the patent system has the potential to overcome problems of appropriability or excludability. But patents may not be a perfect instrument for doing so. Dasgupta and Stiglitz (1980) argue that intellectual property rights that have the characteristics of patents, where the first to discover wins the patent, may lead to racing and over-investment in R&D (the common pool effect) or duplication and repetition (otherwise known as 'stepping on toes'). Intuitively, Dasgupta (1987) observes that from a normative perspective each inventor or innovator "wants to be the winner whereas society does not care who wins", and thus such races or competition imply over-investment from a social point of view. Such effects may counteract the previous forces which imply under-investment.

Another reason why patents may over-incentivise inventors is based on the Schumpeterian concept of creative destruction. Building on the work of Aghion and Howitt (1992) and Grossman and Helpman (1991), Jones and Williams (2000) argue that, through creative destruction, innovation leads to a redistribution of rents from past innovators to current. Redistribution per se yields no social gain – it is argued – and as such the private payoff to innovation may exceed the social.

On balance, it is likely there is too little innovation

Jones and Williams (2000) estimate that if the appropriability problem were eliminated then R&D spending would increase by around 140 per cent. They estimate that the creative destruction effect stimulates R&D spending by only 25 per cent, suggesting that we should on balance expect to see too little R&D in the free market.[94]

This result is reinforced if innovations are not one-off phenomena. We noted earlier that one benefit of patents is that the procedures require the inventor to make his or her knowledge available to the world. This may provide a base for further advances. However, as such benefits cannot be appropriated by the original inventor even with a patent, the patent system may provide insufficient incentive to innovate.

There may be a socially-optimal patent life

In addition to all the factors discussed above, the impact of a patent system will depend on the number of years for which a patent is granted. The choice of optimal patent life is again a matter of trading off the incentive to the inventor (dynamic efficiency) against the accumulation of monopoly welfare losses (static inefficiency) that are incurred while the patent is in place.

Veall (1992) looks at optimal patent life for horizontal product innovations as modelled by Dixit and Stiglitz (1977), so is particularly relevant for understanding soft innovation. Veall (1992) argues that his results can also be carried over to the trademark context. Assuming that firms compete on the levels of their output, it is shown that the optimal patent life is finite and smaller: the greater are the firms' fixed costs of production; the more substitutable are product variants (so the stronger are the creative destruction effects); the lower is industry output (so the greater the social marginal benefits from increasing output); the higher are development costs for each variant, and the higher is the social discount rate.

93. Although under certain restricted circumstances, the seller can perfectly price discriminate (charge different prices to different consumers) such that the seller can appropriate the whole (maximal) social surplus.

94. Stoneman and Kwon (1996), in their analysis of technology adoption on profits in the UK, confirm that the profits of the non-user do decline as usage of new technology by others extends. Also, although new technology yields a profit gain, that gain declines as usage extends.

Cornelli and Schankerman (1996) argue that the optimal life of a patent is specific to the innovation context – not least because the drivers of innovation differ across sectors. Some industries or technologies may need longer than others (the only practical reflection of this is that pharmaceuticals may be extended longer than other patents). Indeed, some may not need patents at all. Alternative forms of IP may be appropriate but – as discussed – these have their problems too.

The theory thus suggests that in principle, with an appropriate lifetime, patents can be a useful tool by which innovations are guaranteed excludability, which stimulates innovation, but there is a cost in terms of monopoly welfare loss. We have discussed these issues in some depth because similar welfare tradeoffs exist for other IP tools, including those more appropriate to soft innovation.

Contestability promotes innovation

> *Further literature in this vein also suggest a firm that has a monopoly in the product market may have few incentives to innovate. But the more contestable the market, the greater the incentives to innovate as firms seek to gain the monopoly rents that result from an innovation (Stoneman 1995).*

7.3 Copyright

Copyright is an IPR which relates to the expression of an idea, not the idea itself, nor any process by which that idea is embodied in a physical artefact. Many soft innovations can be copyrighted. The UK Intellectual Property Office illustrates the copyright principle with the example that anyone can write a story based on the idea of a boy-wizard, but they cannot copy text or illustrations without permission from other books about the same subject. This stands in contrast to the patent system where the idea itself is protected and owned for a period by the patent holder. Copyright protects sound recordings, films, broadcasts and original artistic, musical, dramatic and literary works, including photographs, sculptures, websites, computer programmes, plays, books, videos, databases, maps and logos. But it does not protect the names, designs or functions of the items themselves. Moral rights, such as the right to be named as the author, are also associated with certain copyright works.

opyright is particularly applicable to soft innovations

Whereas patents do not cover soft innovations, copyright is particularly applicable to new products in the creative industries and also soft innovations in the non-creative sector. Many soft innovations are expensive to produce and cheap to reproduce, making excludability a vital incentive. Current examples concern the unauthorised downloading of music and films from the internet or copying from others' originals, reducing returns to the producer considerably.

It is not necessary to apply formally or pay for copyright in the UK.[95] It is an automatic right. The copyright arises as soon as the work is "fixed" – written down, recorded or stored (in a computer memory) – and in the UK is established once the © symbol is attached to the work with the creator's name and the date created. However, as copyright is not registered in the UK, it is particularly difficult to obtain reliable statistics on the number of copyrights claimed. The owner of the copyright has the right to license or sell it, or otherwise transfer the copyright to someone else.

Copyright in literary, musical, artistic and dramatic work in the UK currently lasts for the creator's lifetime plus 70 years (basically the same as in the EU and the US). For films it is 70 years after the death of the last director, score composer, dialogue or screenplay author. For TV and radio programmes, it is 50 years from the first broadcast. Sound recording copyright currently lasts for 50 years.[96] Publishers' rights, covering the typographical layout[97] of published editions like books or newspapers last 25 years from creation. These lives are considerably longer than the terms of even extended patent rights.

Copyrights may arise from a different rationale than patents

One reason why copyright lasts longer than patents and the absence of registration is provided by Hurt and Schuchman (1966).[98] Primarily discussing books and publishing, they propose that copyright should exist because:

1. An author has an inherent property right in his/her writings, which is merely recognised by the award of copyright. Hurt and Schuchman (1966) discuss how the validity of this argument depends upon the contested views of what is property.

2. Copyrights may be defended by treating an author's works not as objects, the benefits

95. Although this is not the case in all countries. It is the same in the US but there copyright registration is also available as a legal formality intended to make a public record of the basic facts of a particular copyright. However, registration is not a condition of copyright protection.
96. However, consideration is being given to the idea of extending this to 75 years.
97. Its presentation on the page.
98. Who define a copyright as a grant of the aid of state coercion to the creators of certain 'intellectual products' to prevent for a period of years the 'copying' of these products.

of which should accrue to the author, but rather as extensions of the personality of the author and subject to protection as such. This theory plays an important role in both the theoretical justification and actual content of the French, German and Swiss copyright systems. The emphasis of this conception of copyright is on the author's privacy and reputation rather than his commercial interests, and as a consequence under French law the rights granted are virtually inalienable and in some cases perpetual. The three most important are: (1) the paternity right – the right to be identified as the creator of his works and be protected from plagiarism; (2) the integrity right – the right to protection against alteration or deformation of one's work, and the right to make changes in it; (3) the publication right – the right not to publish at all. It is not difficult to see that these arguments may extend beyond books to film, music, art etc.

As valid as such non-economic arguments may be, for current purposes they are here put aside[99] and instead the rest of this section concentrates upon the validity of copyright as an economic mechanism to encourage creativity. It is interesting however, that even as late as 2004, Samuelson (2004) can argue that

> *As interesting and provocative as the literature on the economics of copyright is, even its most ardent fans would have to admit that economics has rarely played a significant role in the copyright law and policymaking process (page 6).*

As with all IPR mechanisms, copyright involves a trade-off between providing an incentive to the producer/innovator at the cost of a monopoly welfare loss: at the welfare optimum, given low reproductions costs, music, film, video game downloads could be virtually free, but then there are no incentives to produce new music, film or games. The excludability provided by copyright provides a price that rewards the creator.

Copyright differs from patents in two ways. They do not always have to be registered, so there may be less potential for innovations to emerge from other innovations. However, it may be argued that "the expression of an idea not the idea itself" will not necessarily create a platform for further creation. Second, it is arguably unlikely that protecting the expression of an idea will generate common pool effects in the way that patents do, even though this is a possibility.

A basic problem with copyright is that the enforcement is in the hands of the owner. Many owners will be individual artists, authors or academics for whom the costs of enforcement are too great. Even if the copyright is sold for a fixed sum or on the basis of a royalty to an organisation such as a publishing house or record company, it may be difficult for the owner of the copyright to obtain a merited financial reward. Recent advances in TPP technologies which allow easier copying from the internet have made the enforcement of copyright even more difficult. Although remedies such as legal downloading with digital rights management have been considered, these may have a deleterious effect on new product launches.[100]

Is there an optimal life for copyright?

An obvious difference between copyrights and patents is in the period of protection. In an informative survey of the economics of copyright, Lindsay (2002) argues that:

> *The optimal limits of copyright protection involve complex trade-offs between the benefits and costs of copyright protection. In other words, the objective of the copyright system is not to establish a balance between the interests of copyright owners and users, but to balance the benefits of copyright protection against the costs of the copyright system, including the costs of establishing and enforcing property rights in copyright material. In this sense, the objective of copyright policy is no different from the objective of systems of property rights in tangible material. Although there are good economic explanations for many of the existing legal limits on copyright protection, there is no basis for assuming that the current limits are optimal (p111).*

Landes and Posner (2003) calculate that roughly 80 per cent of registered copyrights in the US were not renewed between 1910 and 2000 suggesting that, in most cases, the economic benefits from a renewal were not worth the cost. In turn, they argue that the average economic life of a copyright was about fourteen years, (see Landes and Posner, 2003), considerably shorter than the statutory term.

The data in Tables 22 and 23 imply that although copyright may be important to generating creativity, the area of application

99. It is interesting that in its Report in to the New Media and the Creative Industries, the House of Commons Culture Media and Sport Select Committee (House of Commons (2007)) express the following opinion on the Gowers (2006) review of intellectual property: "Gowers' analysis was thorough and in economic terms may be correct. It gives the impression, however, of having been conducted entirely on economic grounds. We strongly believe that copyright represents a moral right of a creator to choose to retain ownership and control of their own intellectual property. We have not heard a convincing reason why a composer and his or her heirs should benefit from a term of copyright which extends for lifetime and beyond, but a performer should not."

100. See for example www.bpi.co.uk/news/stats/news_content_file_768.shtml

is limited to about 10-20 per cent of all firms. The Gowers (2006) review of IP in the UK suggests that copyright suffers from a lack of public legitimacy with little guilt or sanction associated with infringement. While criminal and civil legal sanctions against copyright infringement are tough, infringement is extremely common. The fact that the letter of the law is rarely enforced only adds to the public sense of illegitimacy surrounding copyright law. This is attributed to the fact that enforcement through the civil courts is costly, and cases are difficult to prove. Gowers also notes that a large amount of content protected by copyright is not commercially available – so-called 'orphan' works.

> *The existence of such a large volume of old work protected but unavailable (estimates of up to 98 per cent of published work under copyright) means that a great amount of intellectual capital is wasted. Firms and individuals are unable to restore, rework or revive these 'orphan' works to create new commercial and creative capital (page 39).*

Overall therefore, despite its objectives, the copyright system may have some considerable failings as a protection mechanism and thus, it seems, as a means by which society can best support the generation of soft innovations.

7.4 Design rights

Design rights protect appearance
Design rights apply to intellectual property in the physical appearance of a product and are not concerned with the function or operation of that product. This IP right is not concerned with how the item works but with its appearance. Design rights emphasise the way a product looks, whereas patents concentrate on how it works, and copyright covers non-physical products. Contributory features to a product's appearance include lines, contours, colours, shape, texture, and material. Design rights apply to soft innovations.

In the UK there are several types of design protection available:

> *Registered design* offers protection throughout the UK. The protection lasts initially for five years and can be renewed every five years for up to 25 years. Application must be made for this IP right, a fee has to be paid and it is not automatic.
>
> *Registered community design* (RCD) offers like protection in all of the EU member states. This protection can be renewed every five years up to 25 years. In the period 2003-2007 approximately 273,000 designs were registered and published. Following its 2003 launch, the total number of designs registered in the UK fell from 9,000 in 2002 to less than 4,000 in 2005.
>
> *UK design right* is an automatic right which prevents others from copying a design, but it covers only the 3D aspects of the item and does not protect the surface decoration of the product or any 2D pattern such as wallpaper or carpet design. UK design rights last for up to 15 years from the design's creation.
>
> *Unregistered Community design right* is also an automatic right offering protection from copying the design on any item for three years after the design has been made available to the public. It covers all EU countries.

To qualify for any of these rights, the design must be new and individual in character – which means that the overall impression the design gives the informed user must be different from any previous designs. A design cannot be registered if it is more than 12 months since the design was first publicly disclosed; the design is dictated only by how the product works; the design includes parts of complicated products that cannot be seen in normal use (for example, vehicle engine spare parts or the parts inside a computer); it is offensive; or it involves certain national emblems and protected flags. A registered design provides the right to sell, or licence someone else to use it.[101]

Although design rights are separate from patents in the UK and Europe, there are design patents in the US. These design patents are similar to US utility patents except that they last fourteen years from the date a patent is granted, rather than twenty years from the date that an application is filed. In Japan, there is protection for 15 years from registration and in Canada 10 years. In none of these countries is there protection without registration.

Design rights may control imitation and copying
Applying the economic logic of marginal cost pricing, designs which are replicable at zero marginal cost should be freely available. But as before, this creates no incentive for the

101. Examples of protected designs can be found at: www.ipo.gov.uk/design/d-applying/d-should/d-should-designright.

designer. Design rights, as with other IPR instruments, stimulate creativity through rewarding the designer by granting monopoly power over a design enabling the generation of a return but at the cost of some monopoly welfare loss. Design rights would appear to be particularly relevant to the protection of soft innovations, both inside and outside the creative industries. Their main function would appear to be to limit the copying by other producers of successful products. By doing so, they encourage product differentiation. As the design of successful products cannot be protected by secrecy there may be an even greater problem protecting designs than TPP advances covered by patents. By their nature, designs are not naturally excludable in a market: this suggests that IPR protection may be of considerable importance.

Design rights are closer to patents than to copyright in that they protect ideas (incorporated in a design) as opposed to the expression of an idea. Like patents, design rights do not allow the designer to appropriate any social benefits from imitators (but there may of course be no such benefits). New designs may also undermine the value of previous designs, but it is difficult to see that there will be common pool effects relating to design rights. Together, all these issues will impact on the optimal life of a design right.

But the jury is out on whether or not they are effective

As to whether design rights are effective, the data in Tables 22 and 23 show that there is clearly demand for such rights. The Gowers Report cites the performance, reputation and export performance of the UK design industry as circumstantial evidence. But it also notes that the legal mechanisms to enforce design rights are complex. The uncertainty of the law and the limitations of 'passing off'[102] mean that small designers cannot afford to take the risks associated with legal action and, accordingly, competitors have no economic incentive to seek permission before using the design. Overall, there is little strong evidence to show that design rights are effective or that their life is optimal. Without any evidence base to the contrary, the implication is that soft innovation once again may not be optimally protected.

102. Passing off is taking business by presenting goods or services as someone else's and is actionable at common law.
103. Although the legal protection of personality rights is a confused issue in English Law. See the discussion in Kolah (2002) pp.83–95.

7. 5 Trademarks

Trademarks can be registered

A trademark is a sign which can distinguish a firm's goods from those of other traders' services (a service mark being the same as a trademark except that it identifies and distinguishes the source of a service rather than a product). A sign includes, for example, words, logos, pictures or a combination of these. Whereas patents require novelty and copyright requires originality, a trademark must be distinctive. The trademark can be used as a marketing tool so that customers can recognise a particular supplier of products or services through branding. A trademark can also be sold, leased or licensed for use by another trader.

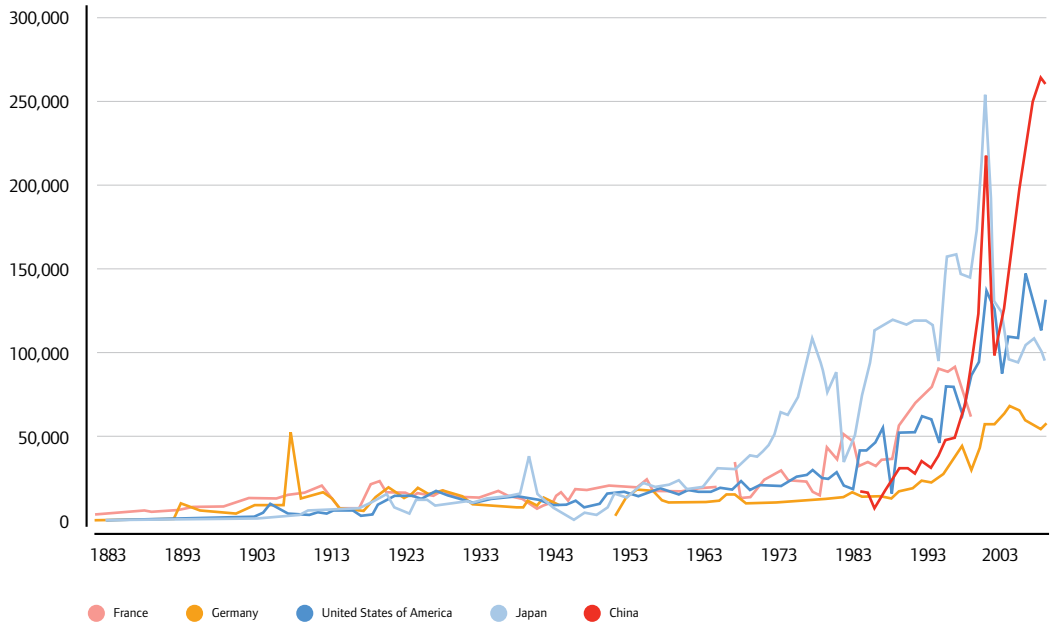
Whereas patents are not available for aesthetic innovations, such innovations may be trademarked. For example, a rock group[103] can trademark its name, a product like an iPod with a particular aesthetic can be trademarked as can particular products like Mars bars and Crunchie bars. A non-aesthetic product may be patented and trademarked with design right protection too. An aesthetic product may carry copyright, a trademark and perhaps also a design right.

A registered mark confers the right to use that mark on the goods and services in the classes for which it is registered, and the legal right to take action against anyone who uses the mark or a similar mark without permission. To be registerable, the trademark must be distinctive for the goods and services for which application is made; and not the same as (or similar to) any earlier marks on the register for the same (or similar) goods or services.

A trademark does not have to be registered. An unregistered trademark provides certain rights under common law and the owner can use the TM symbol. However, it is easier to enforce rights if the mark is registered and uses the ® symbol. In the UK, application for registration is made to the Trade Marks Registry of the Intellectual Property Office, with a renewal fee payable every ten years. A European Community Trade Mark application is made through the Office for Harmonisation in the Internal Market. As with other IPR instruments it is necessary for owners to police their rights in the courts.

Figure 2 plots the total number of Trademark Registrations in 5 Trademark Offices from 1883

Figure 2: Trademark registrations



Source: WPO Statistics Database.

to 2005. The growing use of trademarks is obvious.

It is commonly argued (see for example Besen and Rescind, 1991) that trademark protection differs from patents, design rights and copyrights in that trademarks did not originate as an incentive for innovation or creativity. Instead, their origin is usually associated with the medieval guild practice of affixing an identifying mark to a goblet or like product. Accordingly, the initial purpose of trademark protection was to make it illegal to pass off the goods of another artisan as those of a guild member. This echoes current concerns with fake designer goods such as trainers and watches.

Lamella and Silver (2006), controversially, argue that trademarks were:

> *Originally connected with the problem of information asymmetries and the need to provide information for assisting exchanges so as to avert the market failure brought about by adverse selection. However, this information-conveying function is also accompanied by a differentiation effect, arising from the power of persuasion that signs can exert on individuals. The exploitation of differentiation has given rise to the practice of branding, which ties markets and consumption to the realms of meaning and experience (pp 937 –8).*

Barnes (2006) argues, in contrast, that because trademark owners contribute to the store of information available for everyone to use, they are closer to authors and inventors than is generally recognised. Trademarks have non-rivalrous uses, as consumers may use them without interfering with another's use, and have the characteristics of public goods in such circumstances. They can thus be justified on similar grounds.

As with other forms of IP, a trademark's value is enhanced both by the quality of the product and public familiarity with it. Trademark protection may dampen competition by limiting the ability of competitors to copy a successful mark or packaging design, even though these features are not protected by copyright or patent. Trademarks thus provide an economic incentive to certain types of behaviour, especially orderly marketing, by identifying products and their sources and may also help overcome some public goods problems. But they also have their costs.

Trademarks protect accumulation of goodwill

From our perspective, the essential difference between a trademark and other forms of IP rights is that it not only protects intellectual property, but it enables the accumulation and storage of goodwill and brand awareness, and enables those intangibles to be used or exploited in the selling of products in other markets or at future dates. It thus provides a means by which such intangible assets may be transferred over time. This raises the possibility that trademarks enable firms at least partly to appropriate future returns from similar innovations.

Thus, Apple computers built a reputation for non-standard computer products which many consumers preferred that they were able to exploit in later and varied products. The Virgin brand has been applied to record shops, airlines, financial services, broadcasting and telecommunications, all exploiting a common pool of goodwill and brand awareness.

In the absence of trademark protection, these possibilities would not exist and as such the possibilities of transferring reputations for quality and innovativeness across products and time might be limited and the returns to establishing a reputation for quality through innovation greatly reduced.

We know little about whether trademarks are granted for too long or too short a time to be of net social benefit. Landes and Posner (2003) find that in the US the average economic life of a trademark is around 15.5 years which is close to the full term. This might suggest that increases in the term may further stimulate innovation. However, that does not necessarily make the full term socially optimal.

Trademarks appear to work – at least to some degree

The survey data in Tables 22 and 23 show that trademarks are one of the more popular IPR mechanisms. Greenhalgh and Rogers (2007) investigate whether applications for trademarks are suggestive of product innovation improving the profitability and productivity of firms. They use data on both trade (and service) marks sought via the UK Patent Office (UKTM) and the European Community Office for Harmonisation of the Internal Market (CTM) from 1996-2000. They find that firms' stock market values are positively associated with R&D and trademark activity by firms. Larger differences are found between service firms with and without trademarks than for manufacturers. They also find bigger impacts on stock prices when the services firm is applying for Community marks, rather than just applying for UK marks. That said, the marginal returns to extra trademarks per firm appear to diminish quite rapidly over time

Greenhalgh & Rogers (2007) also find that firms with trademarks have significantly higher value added than those without (by between 10 per cent and 30 per cent across all firms). Their interpretation is that trademark activity proxies a range of other unobservable firm-level characteristics including innovativeness that raise productivity and product unit values. They find that in the short run, greater IP activity by other firms in the industry reduces the value added of the firm, but this same competitive pressure has later benefits in productivity growth reflected in higher stock market value.

Gowers (2006) concludes that although trademarks are affordable they can take between six and nine months to be granted and there is currently no 'fast-track' route available for firms that require protection more quickly to start building up their brand. Evidence to his review raised concerns that copycat packaging (especially from supermarkets) threatened their brands and constituted unfair competition, and that the hurdle of 'consumer confusion' required for trademark infringement was too difficult to prove in court. He notes many instances of counterfeiting of trademarks. As with copyright, enforcement of trademarks is often a low priority for the police, not least because litigation is costly.

7.6 Conclusions

This chapter has rehearsed the theoretical arguments and empirical evidence surrounding the operation of four different institutional IP mechanisms relevant to innovation. Three of the mechanisms – copyrights, design rights and trademarks – are particularly applicable to soft innovation (as well as to TPP innovations) but the fourth, patents, are much less so.

Each IP mechanism has a different emphasis. Copyright – which is particularly applicable to aesthetic products such as books, music and films – protects expression of ideas, whereas patents protect the idea itself. Protection of an expression may be much less valuable than protection of an idea. Offsetting this, however, copyrights do tend to last longer than

patents (and in some legal systems are in effect perpetual).

Design rights are similar to patents, but extend to the aesthetic characteristics of a product. In some countries they are called 'design patents'. However, design rights or patents do not require an advance in knowledge. They reflect 3D aesthetic differences between products and as such are an important IPR mechanism for soft innovation.

Trademarks are different again. There is some question as to whether trademarks should be considered primarily as an IPR mechanism, or rather as a reputational device. Our position has been to focus on the similarities between trademarks and design rights, while acknowledging that trademarks build reputation capital by allowing innovators to internalise some of the benefits which would otherwise accrue only to future innovators standing on their shoulders. As such, they may be a powerful complement to other IPR mechanisms.

The survey evidence suggests that businesses do not regard these four mechanisms as the primary means by which they protect their intellectual property. In some circumstances they prefer other non-institutional means, such as trade secrecy and lead times. However, where there is no excludability, the different mechanisms do offer varying degrees of protection. The institutional mechanisms may even be socially preferable to market mechanisms because of the information that they reveal to other innovators – not simply because they incentivise innovators through protecting their returns.

All IPR mechanisms stimulate creativity and innovation by providing the inventor with monopoly rights that may be exploited to yield a return. Their monopoly power however means a cost to society equal to the monopoly welfare loss. This static inefficiency has to be traded off against the gain in dynamic efficiency.

The Gowers review has broadly given the UK IPR system a clean bill of health. But enforcement remains in the hands of the holder of the IP, and the cost of enforcement may impose a practical limitation on IPR protection.

> *Finally, observations on the importance of competition to innovation suggest there is an important distinction between contestability of product markets and competition. Some monopoly power over an innovation may be important for incentivising innovators, but contestability is important for ensuring that it is the businesses that are best placed to produce at lowest cost that win the dominant position.*

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Part 8: The impact of soft innovations on the performance of firms

8.1 Objectives

Innovation and the performance of firms: does soft innovation matter?

Many economic studies look at the impact of TPP and organisational innovation on the performance of firms. Our objective in this chapter is to explore how soft innovation activities impact on such performance, and on productivity and profitability in particular, although market share, value added, equity values and total sales are also useful indicators. At higher levels of aggregation, there may also be concerns with market-wide impacts (allowing for spillovers to other firms, for example) and economic welfare.

104. Their impact on stock market value is measured using Tobin's q, which is the ratio of the firm's stock market value to the book value of its assets.

8.2 Soft innovation and the performance of firms: the evidence from copyrights, trademarks, design and the PIMS database

Indicators of soft innovation suggest on average a positive rate of return

8.2.1 Returns to copyright

Greenhalgh and Rogers (2007) have reviewed the large literature on the impact of copyright on the profitability of firms. Overall, they argue that the evidence for the value of copyright is far from clear. They note that empirical analysis is hampered in the UK and Europe by the fact that there is no legal requirement to register creative work.

There have been several US studies. Landes and Posner (2003) look at the 1910-1991 period when copyright required registration and renewal, and conclude that around 80 per cent of copyright had little economic value.

Png and Wang (2006) examine the impact of copyright extensions on the production of movies in OECD countries, finding that extension from 50 to 70 years after the author's life increased production by around 10 per cent.

Baker and Cunningham (2006) analyse the effect of US federal court decisions that broadened the reach of copyright on the market value of firms, and find one ruling alone that may have raised the market value of firms by up to 0.45 per cent (or $8 million). Mazeh and Rogers (2006) also find that plaintiffs in copyright disputes have higher market values than similar firms. These studies are exceptions to the rule, however. Overall, Greenhalgh and Rogers (2007) conclude, there is little compelling evidence for the value of copyright on firm performance.

8.2.2 Returns to trademarks

Other studies have looked at the value of trademarks. Seethamraju (2003) analyse the value of trademarks in 237 US firms from selected industries in the period 1993-97, finding a positive effect on sales and market values. A study of 300 Australian firms from 1989 to 2002 by Griffiths *et al.* (2005) find that the stock of trademarks is a significant determinant of profits, but the impact was smaller than that of patents or registered designs. They further report that the value of trademarks have risen during the years studied.

Greenhalgh and Rogers (2007a) analyse a large sample of publicly-quoted UK firms for the 1996-2000 period. Their results indicate that stockmarket values are positively associated with R&D, patent and trademark activity by firms. They find a larger impact in service sector firms than in manufacturing. They

also find a greater impact on stock market value when the services firm has applied for European Community trademarks as well as UK trademarks.[104]

Greenhalgh and Rogers (2007a) also investigate the relationship between trademarks and productivity levels and growth rates for both quoted and unquoted firms. Their results indicate that firms that trademark have significantly higher value added use than those that do not – the difference is between 10 per cent and 30 per cent across all firms. In addition, higher trademark intensity has some positive association with productivity growth in services, though the results are relatively weak for manufacturing. Finally, they also find that, in the short run, higher trademark activity by rivals in the industry reduces a firm's value added. But these negative market-stealing effects are not large enough fully to offset the positive spillovers, meaning that there is a net positive impact of rivals' trademarks on a firm's productivity and of rivals' patents on a firm's market value.

8.2.3 Returns to design

The Department of Trade and Industry's (2005) review of the contribution of design to economic performance argues that there is strong empirical evidence for a positive link between design and company performance. The authors quote Gemser and Leenders's (2001) study of Dutch firms which finds that integrating industrial design into new product development has a significant and positive influence on company profits, turnover and export sales. Their study also shows that the impact of design on performance differs across sectors, being much stronger in precision instruments, where design use is less mature, than in furniture, where it is more mature.

Haskel *et al.*(2005) assess the impact that expenditure on design has on company performance using the Community Innovation Survey. Firms are grouped according to their productivity and turnover in order to assess whether more productive firms with higher growth tend to be more innovative or spend more on innovative activities, including design. They show that the more innovative firms do tend to have higher growth in turnover and productivity, but there is no simple relationship between expenditure on design and the performance of firms.

Haskel *et al.*(2005) also consider how expenditure on design affects the probability of innovating and productivity growth when controlling for other factors. They find that firms with higher design intensity are more likely to introduce product innovation, but are no more likely to carry out process innovation. Importantly, they find a positive association between design expenditure and a company's productivity growth. While it is difficult to prove that spending on design causes productivity to increase, this finding lends support to the findings of previous research, much of which is based on case study analysis rather than statistical evidence.

Bruce *et al.* (1995) show that 60 per cent of the 178 UK funded design projects they study can be defined as commercially successful (measured by positive financial returns on investment). Around one-half of all projects for which export information was obtained saw some international trade benefit. Whyte *et al.*(2002) show that around one-half of export sales made by 'Queens Award for Exports' winners can be directly attributed to their investment in design. Sentance and Clark (1997) find that design-intensive industries and firms are much more active in export markets. They estimate that had UK manufacturing invested one-third less in in-house design the growth rate (of manufacturing) would have been 0.3 per cent less per year over the period 1986-1996.

Design Council (2005a, b) surveys of UK firms find that rapidly growing companies attach much greater weight to design than those with average growth. Separate research for the Design Council (2005c) shows that 63 design-intensive companies outperformed the FTSE 100 share index by more than 200 per cent in the years from 1994 to 2004. Bessant *et al.*(2005), in a broad overview of research on design and business performance, conclude that *'…there is clear evidence of the contribution and therefore potential for design to affect competitiveness'*.

Swann and Birke (2005) undertake a detailed empirical and conceptual analysis of the links between innovation, design and performance. They cite several studies that show – mainly through case studies, but also through surveys – that design is an important source of innovation in its own right. They reject the assumption that most innovations emanate from R&D. They also note that although these studies suggest a strong correlation between design input and the performance of firms, it is difficult to establish clear causality. The multifaceted nature of design makes it hard to isolate it from more traditional factors affecting

performance, such as levels of investment or market conditions.

8.2.4 The Profit Impact of Market Strategy (PIMS) database

The Profit Impact of Market Strategy (PIMS) database is a potential source of data on soft innovation by US, Canadian and European businesses. This large database is designed to measure the relationship between business actions and results. Initiated in the mid-1960s, the project has been maintained by the Strategic Planning Institute since 1975. Its data cover the characteristics of the market environment, the state of competition, the strategy pursued by each business, including innovation activity, and also business unit performance. For our purposes, the dataset is useful in using definitions of innovation that include softer aspects.

Earlier studies using this database have found profit performance to be related to at least 37 factors including market share, product quality, R&D and marketing expenditures, investment intensity and corporate diversity. Between them these factors explain close to 80 per cent of the variations in profitability among businesses in the PIMS database.

In a review of PIMS-based research, Buzzell (2004) reports a consistently strong, positive association between product quality and profitability. Many soft innovations improve the quality of a product. Using structural equation modelling Philips *et al.* (1983) show that quality improvements lead to gains in market share as well as higher selling prices, while Hildebrandt and Buzzell (1991) show that quality improvement is the single most important source of gains in market share by a firm, which in turn favourably affects prices and profitability. Jacobson and Aaker (1987) observe similar relationships in their study of year-to-year changes in returns on investment.

Using pre-tax, pre-interest Return on Capital Employed (ROCE) as a measure of profitability at the business unit level, Clayton and Carroll (1994) find statistically significant 'drivers' of financial performance including relative quality (the strength of customer preference for products and services), holding patents or proprietary know-how, and innovation, measured as the importance of new products in the revenue stream of a business compared with its competitors. Innovation is an equally powerful determinant of a business's ability to grow market share.

Although there is only weak direct correlation between R&D input and business growth there are clear statistical links between:

- R&D effort, the actual 'amount' of innovation and the creation of intellectual property advantages through patents or exclusive know-how;
- speed to market and the success businesses have in maintaining high rates of innovation – the proportion of new products in their sales mix;
- innovation, intellectual property and the ability of businesses to satisfy customers' preference for high-quality products and services

Clayton (2003) reports similar findings using the PIMS database to look at firms in the service sector.

8.2.5 Other evidence

Studies from fields other than economics have looked systematically at the impact of aesthetics and design on the performance of firms. Swan, Kotabe and Alfred (2005) argue that firms globally find it advantageous to develop products that visually communicate and appeal to a wide range of users. They cite Yamamoto and Lambert (1994) who find that pleasing aesthetics influence consumer product evaluation, even if the appearance has no bearing on the functional performance of the product. This highlights the importance of visually communicating positive attributes about the product to the consumer, as well as informing consumers about how to use the product.

Swan *et al.* also argue that a distinctive aesthetic capability can lead to a competitive advantage. Although a product's aesthetic attributes may be imitated, other less tangible factors can sustain competitive advantage. Bayus and Putsis (1999) look at product proliferation. Their empirical results for the personal computer industry over the period 1981-1992 demonstrate that product proliferation alone has a negative impact on a firm's net market share – any advantages from product innovation come from the characteristics of the product rather than the number on the market.

8.3 The impact of soft innovation on the performance of firms: some examples

There are clear examples of particular soft innovations producing high revenues, large market shares and profit gains

In the absence of existing research on the the specific impact of soft innovation, this section provides some illustrative examples of soft innovations. These are not chosen to be representative; rather, they illustrate the considerable returns that can be earned from soft innovation and show that it can have considerable impacts on company performance.

8.3.1 Films

When a new film is first released, it is a horizontal soft innovation. Its market value will reflect the film's lifetime earnings, and how these translate into revenues and profits for the rights holder. There are a number of publicly available lists of the world's top grossing films. In Table 24 we reproduce one such list sourced in 2008 from www.the-movie-times, which also provides estimates of film budgets. The highest grossing films at the box office can earn up to ten times their budget.[105]

8.3.2 Books

As with films, a new book title is a horizontal soft innovation when it is launched. Forbes magazine estimates that J K Rowling, author of the Harry Potter books, earned £41 million in 2005 while Dan Brown, author of The Da Vinci Code earned £48 million. Considering that the author will typically only receive in royalties about 8-10 per cent of the revenues,[106] this suggests huge overall sales income for these franchises. The Harry Potter phenomenon has been supported by strong marketing and tie-ins, including films. Bloomsbury, the publisher of Harry Potter, states that sales of its children's division had increased 261 per cent to £98.2 million from £27.4 million in 2006, a year in which there was no new Harry Potter title (Sabbagh, 2008). The company said that the "main contributor" to the £70.8 million improvement was sales of Harry Potter and the Deathly Hallows.

8.3.3 Budget air travel

The budget airlines provide passengers with less space, more – but less convenient – destinations, poorer in-flight catering, less ticket flexibility, and reduced baggage allowances compared with traditional airlines. The aesthetic of the air travel experience (or the sensory experience) is reduced, making this change a soft vertical product innovation, but with a reduction in product quality. The commercial success of the product results from the fact that the price is reduced by more than quality (enabled by process innovations in booking and turnround times) which makes the product attractive to many more potential flyers.

105. This is even before a film's revenues through other windows such as DVD and pay-TV are considered.
106. Source: 'The Author', September 1998.

Table 24: Top grossing films

Rank	Movie	Year	Budget (M)	World BO (M)
1	Titanic	1997	$200	$1,835.0
2	The Lord of the Rings: The Return of the King	2003	$94	$1,129.2
3	Pirates of the Caribbean: Dead Man's Chest	2006	$225	$1,065.7
4	Harry Potter and the Sorcerer's Stone	2001	$130	$968.7
5	Pirates of the Caribbean: At World's End	2007	$200	$961.0
6	Harry Potter and the Order of the Phoenix	2007	$150	$938.5
7	Star Wars: Episode I – The Phantom Menace	1999	$110	$925.5
8	The Lord of the Rings: The Two Towers	2002	$94	$920.5
9	Jurassic Park	1993	$63	$920.0
10	Shrek 2	2004	$75	$912.0

Source: www.the-movie-times.com/thrsdir/alltime.mv?adjusted+ByAG

It has been a very profitable innovation. Easy Jet was established on 18 October 1995 and started operations on 10 November 1995 with two aircraft. By September 2006 its fleet of aircraft had grown to 122 aircraft and its network covered 262 routes and 74 airports in 21 countries. Passenger numbers were 33 million. In 2007 it had passenger revenue of £1626 million and made a profit of £191.3 million before tax.[107]

8.3.4 Plastic surgery

Although cosmetic surgery may of course be undertaken for many reasons, many product innovations in the sector can reasonably be considered soft innovations. US expenditure on cosmetic surgery and non-surgical procedures in 2004 was estimated at $9.4 billion; in the UK in 2004, the market was estimated as £225 million, the number of procedures undertaken rose by 60 per cent compared with 2003; the global breast-implant market (which was the first sector of the market to take off in the US) is estimated alone to have been worth around $650 million per annum.[108]

A particular innovation has been the use of botox to smooth out wrinkles. On April 15, 2002, the FDA announced the approval of botulinum toxin type A (BOTOX Cosmetic) temporarily to improve the appearance of moderate-to-severe frown lines between the eyebrows (glabellar lines). California-based Allergan reported sales for Botox of $705 million in 2004 – up 25 per cent on 2003. The shares of this company have at times traded at 26 times the level of earnings, suggesting that investors have been very optimistic about its future growth prospects.

8.3.5 Cirque du Soleil

Cirque du Soleil is a major Quebec-based organisation which provides innovative high-quality artistic entertainment around the world. Although it started as a group of only 20 street performers in 1984, by 2008 the company had almost 4,000 employees from over 40 different countries, including 1,000 artists. Its declared mission is to invoke the imagination, provoke the senses and evoke the emotions of people around the world. It is very much an exemplar of soft innovation.

In 2008, Cirque du Soleil presented 18 shows simultaneously throughout the world. Close to 80 million spectators have seen a Cirque du Soleil show since 1984, of which 10 million people saw a Cirque du Soleil show in 2007 alone. Cirque du Soleil has not received any grants from the public or private sectors since 1992. Estimated annual revenue exceeds $600 million.[109]

8.3.6 The Eden Project

The Eden Project is a charitable large-scale environmental complex located in a reclaimed china clay pit in Cornwall in the west of England. It recognised the demand for a new form of environmental tourism and marketed itself to appeal to contemporary green concerns.

The complex comprises a number of domes that house plant species from around the world, with each emulating a natural biome. It describes itself as *"a project which successfully combines ecology, horticulture, science, art and architecture. It provides an informative and enjoyable experience while promoting ways to maintain a sustainable future in terms of human global dependence on plants and trees. The exhibits include over one hundred thousand plants representing five thousand species from many of the climate zones of the world."*

The project opened to the public on March 17th 2001, and has involved a total capital investment of £140 million. The Eden Annual Review 2006/2007 reports annual visitor numbers of just under 1.2 million and total visitor revenue of £16.1 million.

8.3.7 The London Eye

Like the Eden project, the London Eye[110] offers a sensory experience and may thus be considered a soft innovation. The London Eye is essentially a Ferris wheel in the centre of London offering views up to 40 kilometres in all directions. Opening in March 2000, British Airways was the main sponsor until February 2008 and was joint shareholder with Marks Barfield Architects and The Tussauds Group until 2005. The London Eye is the UK's most popular paid for visitor attraction, visited by over 3.5 million people a year. In 2004 revenue was £38.6 million, an increase of 5 per cent over 2003. In November 2005, British Airways sold its stake in the London Eye to the Tussauds Group for £95 million with the new owner also assuming the £175 million debt the Eye owed the airline. It is now part of the Blackstone group.

8.4 Conclusions

This Part has explored the impact of soft innovation on the performance of firms.

107. See www.easyjet.com
108. See www.moneyweek.com/file/2838/carving-out-a-profit-from-cosmetic-surgery
109. See www.cirquedusoleil.com
110. See www.londoneye.com

Despite considerable theoretical and empirical evidence that the more traditional types of innovation matter to company profits, value added or sales, there is as yet little existing evidence to reflect the importance of soft innovation. We have sought to interpret some of the evidence relating to the impact of copyrights, trademarks and designs as partly reflecting the impact of soft innovation. These exercises indicate that soft innovation does yield positive payoffs to firms, but there is still considerable doubt as to whether the existing methods can give a true picture of that impact.

The potential market impact of soft innovation is illustrated using some high-profile examples, from budget airlines to plastic surgery. These examples are neither randomly chosen nor definitive. They do however show that soft innovation can be an important contributor to the performance of firms. Thus, just as it has been shown earlier that soft innovation is widespread and extensive, although generally ignored in the analysis of innovation, it has now been shown that soft innovation can generate significant returns. These arguments reinforce the view that soft innovation merits more attention both in terms of analysis and, possibly, in terms of policy.

The positive payoff to soft innovation may also throw some doubt upon the validity of analyses of payoffs that concentrate on TPP innovation alone. In such studies, if soft innovation is excluded or ignored, the payoffs to such innovation are often incorrectly attributed to technological product and process change, perpetuating the belief that this is the only source of innovation.

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Part 9: Soft innovation and government policy

9.1 Introduction

There are two dominant rationales for policy: market failure and international comparisons

Our objectives in this chapter are to explore the rationale for government intervention in the soft innovation process, the tools or instruments available for intervention and the potential payoffs

The policy literature has followed two main paths in the discussion of functional or TPP innovations. The first is built on the concept of market failures: where the failure of markets to provide appropriate private incentives to innovate requires intervention as a corrective action (but see Hutton and Schneider, 2008 for a critique of this approach when used in practice). The second path is essentially a political argument: more innovation is seen as better, and policy should seek to raise a country's position in the international league tables.

The two approaches tend to come together in the literature on national systems of innovation (Nelson, 1993). One might ask whether there is market failure in the provision of particular products such as biotechnology, for example. This may reflect the difficulties that innovators in such areas face in appropriating all the profits to be gained from innovation. However, there are other markets in which firms operate – not just product markets. For example, if the capital market does not provide enough risk capital then innovation may be below the socially desirable level. Alternatively, if there are insufficient skills being generated in the labour market then this may also slow down innovation. Problems in markets such as these tend to be considered as part of the institutional environment or the national system of innovations (Nelson, 1993).

This chapter considers both approaches to policy in a soft innovation context. Our two main questions are: (i) do markets operate sufficiently well in providing incentives for soft innovation?; and (ii) does the performance of the UK bear reasonable comparison with the performance of its competitors?

There is a considerable literature on technology and innovation policy (see for example, Diederen *et al.*, 1999 and Stoneman, 1987, 1995). Much of it tends to concentrate on R&D and manufacturing rather than other sectors of the economy. NESTA (2008) reminds us that services are now the largest sector in most economies and as such merit more attention in innovation policy. But there is no specific policy literature on soft innovation. Although some studies look at specific sectors, such as the creative industries or pharmaceuticals, this chapter offers a general framework for thinking through policy issues as they relate to soft innovation.

9.2 Market failures

Market failure in innovation may be widespread

Economists have long believed market failures to be prevalent in the innovation process: the private incentives to innovate may not match the social incentives, warranting government intervention. Our analysis starts by looking at the incentives for soft innovation in the absence of concerns about risk and appropriability (imitation or reproduction). We then consider how soft innovations are

diffused or spread, after which we consider issues surrounding risk, appropriability and intellectual property.

9.2.1 Incentives for variety

Incentives to offer a variety of products may be weaker than social incentives
In economic models of product differentiation an important issue is whether or not markets provide the incentive for a sufficient (or an excessive) variety of goods to emerge. Different models have different assumptions. In some scenarios, expenditure on developing variety may be too low; in others, it may be too great. The conclusion of Lancaster's (1990) survey is still a useful summary of the position:

> *There is much disagreement on an important policy issue-whether particular market structures produce more or less variety than is optimal. The conclusion in this regard varies from model to model, and in the more complex models, from situation to situation. A fair statement, however, is that most of the models predict that the monopolistic competition equilibrium will give more than optimal variety under most circumstances, and that protected monopoly will gives less variety than is optimal. There seems to be no clear cut answer to such a question as whether an oligopolistic structure of multiproduct firms, or a monopolist attempting to deter entry, will result in more or less than the optimal degree of variety.*

Thus while government intervention may sometimes be needed to stimulate innovation in cases where there are insufficient incentives to produce variety, this need will be specific to situations and no general presumption can be made. And even if market failures can be established, there is still an issue about the most appropriate instruments policymakers should use to address them.

9.2.2 Spillovers, externalities and network effects

Soft innovation may involve externalities
Market failure may often result from spillovers or externalities and network effects. Soft innovation is no exception. Spillovers may be across firms or between firms and consumers and represent impacts of one economic actor's behaviour on others. In general, even with intellectual property rights, an innovating firm cannot appropriate the whole social benefit from its innovative activity.

Thus one firm may open a market for other firms: George Lucas's film *Star Wars* created a market for Science Fiction films which was exploited later by the *Battlestar Galactica* franchise. Network effects can arise when the benefits to a single user increase with the number of other users. This might be facilitated by the determination of a technology standard that may assist all future consumers in the choice of appropriate technology. Such effects mean that the return to private actions do not fully reflect social benefits and thus the extent of such action will be too low from the viewpoint of social welfare.

9.2.3 The diffusion of soft innovations

The spread of innovation may also be sub-optimal
It is not always the case that fastest is best when it comes to spreading – or diffusing – innovations.

A number of factors may cause the path to diffusion to differ from that which is best for society, including: (i) common pool issues (the 'tragedy of the commons'); (ii) industry market structures, if there is imperfect competition for example; (iii) mistaken expectations as to future technology improvement; (iv) informational spillovers, and (v) a lack of agreed technology standards.

Where there are likely to be benefits from the use of an innovation, tax incentives or subsidies may be justified. If other firms do not know about the true value of an innovation and this is preventing its widespread adoption, policies aimed at providing market participants with information may be needed.

However, such interventions may have unintended consequences. So, for example, an information awareness campaign may cause private information agencies to reduce their own provision. And subsidies which serve to increase the demand for a particular innovation may lead suppliers to increase prices. Such arguments may apply equally strongly to soft innovations as they do to TPP innovations.

Where a significant number of users are adopting an innovation, compatibility standards may need to be set. David and Greenstein (1990) warn however of the difficulties that policymakers may face. It is hard to know when is the best time to set such a standard. By the time policymakers recognise the need to do so, inferior standards could already have been widely adopted, especially

if there is no accepted view of what is best; it may then be difficult to overcome the inherited standards from innovations that have already been adopted. In addition, policymakers will face political-economic constraints if the intervention creates 'widows and orphans' left with standards that are no longer supported in the market.

9.2.4 Risk, uncertainty, insurance and missing markets

There may be reasons for government intervention to finance innovation.
A variety of issues surrounding the availability of finance (and insurance) for innovation may lead to market failures. The evidence suggests that the innovative activity of small and medium enterprises especially in high-tech sectors is constrained by financial factors (Canepa and Stoneman, 2007). More generally, there may be inadequate access to high risk capital (Kaivanto and Stoneman, 2007). Insofar as investments in some soft innovation activities are potentially high risk, the correction of these missing markets may also be a potential policy tool for stimulating soft innovation.

9.2.5 Intellectual Property Rights

The IPR regime impacts upon incentives to soft innovate
Part 6 explored the justification and operation of Intellectual Property Rights, recognising that copyright, design rights and trademarks had a role in protecting soft innovation.

Although formal IPR mechanisms are not seen as the most important means by which firms protect their intellectual property – they also use non-institutional mechanisms such as secrecy and lead times – the institutional mechanisms may be preferable to market mechanisms from the viewpoint of social welfare because of the information they reveal.

We have seen how all IPR mechanisms stimulate creativity and innovation by providing the inventor with monopoly rights that may be exploited to yield a return. The social cost however is the welfare loss associated with granting the investor that monopoly.

The Gowers Review of the UK's IPR system generally gives it a clean bill of health. A common problem in the different mechanisms is that enforcement is in the hands of the holder of the IPR and enforcement can be prohibitively expensive. The extent of protection offered may thus be limited in practice. Gowers (2006) has already offered policy recommendations in this area and the UK government has promised action on enforcement in response (DCMS, 2008).

9.2.6 Competition and monopoly

Contestability promotes innovation
One of the long-running arguments in the economics of innovation concerns whether market power stimulates or deters innovative behaviour. The answer informs anti-trust policy.

We stress that it is the contestability of the market that matters rather than the existing structure. In other words, monopoly does not itself deter further innovation, but a lack of contestability does. For the purposes of innovation policy therefore, governments do not need to control monopolies. As long as the market is contestable the economy will, given appropriate IPR mechanisms, generate its own incentives to further innovation and the eradication of any incumbent's monopoly.

Anti-trust policy, the main thrust of which is to prevent abuses of dominant positions (as in Article 82 of the Treaty of Rome) and promote contestability, would seem to be the appropriate policy stance. From this perspective, market power is the means by which the return that induces the innovation is generated and it is thus desirable. What is not desirable is that the market power should be used to prevent further innovation by limiting the contestability of the market. Policy should worry less about current market positions and concentrate instead on ensuring contestability.

9.2.7 An overview of market failure issues

The market failure approach is useful if not definitive
The market failure approach suggests many reasons why markets may not generate socially desirable outcomes when they are left to their own devices. These arguments are commonly deployed in the field of product and process innovation, but we have argued that they also apply to soft innovation and may similarly justify intervention in that area. However, the outcomes in markets are often very situation-specific and thus do not lend themselves to generalisable policy recommendations.

9.3 International comparisons

Government intervention in innovation is also sometimes justified in terms of international comparison

We have seen how soft innovation can be an important contributor to the performance of firms and that soft innovation can generate significant returns. It may well be the case, therefore, that if soft innovation in the UK lags behind that in other countries then there is a case for government intervention. A fundamental difference between this and the market failure rationale is that this argument takes little note of the social costs of achieving any improvement.

An obvious problem with international comparisons of soft innovation performance is finding appropriate metrics. We have previously pointed to the value of trademarks, copyright and design rights. However, copyright numbers are not usually recorded, and are thus not particularly useful here. While trademarks and design rights are useful, they do not only measure soft innovation, and include some functional or TPP innovations. Our approach is to use whichever data are readily available to give a sense of the UK's soft innovation performance compared with its competitors.

International data suggest that UK performance does not head the international league tables

Table 25 presents shows the number of trademark applications filed in seven different countries. These may have been be filed by either national or overseas residents. Similar data are represented graphically in Figure 3 for five countries. One problem with these data, however, is inconsistency over time arising from the introduction of the European Trademarking system in 1996.

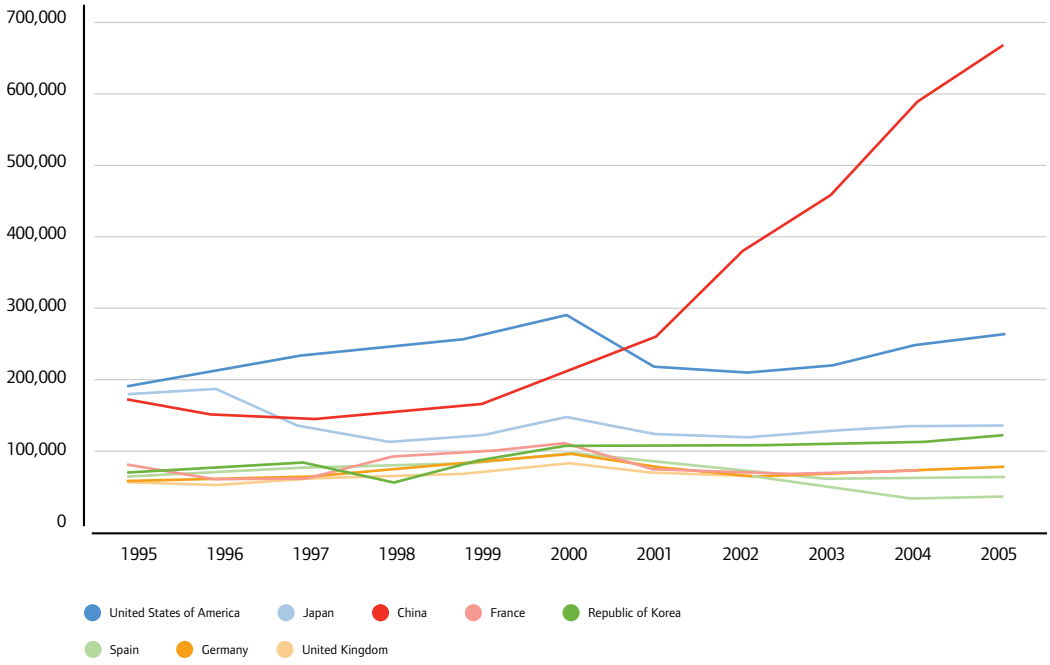
There may be many arguments about the international comparability of such data, for example should one use the raw data or should one relate them to the size of the economy? Using absolute numbers, these data reflect the dominance of the US for most of the period and the decline of Japan between 1990 and 2000. The most interesting feature is that from 2001 China took the lead in registering trademarks (with 85 per cent registered by residents) and since that time has been increasing that lead. There are no obvious disparities in the data between the major European economies.

Table 25: Trademark applications filed, by country, 1990-2005

Country	1990	2000	2004	2005
France	95,091	111,792	73,654	8,602
Germany		97,337	74,197	80,091
Italy	-	58,999	7,950	8,833
Japan	171,726	145,834	135,979	135,990
Sweden	11,920	16,651	13,800	1,472
UK	39,632	85,578	35,564	36,998
US	127,346	292,464	248,406	264,510

Source: www.wipo.int

Figure 3: Total number of trademark application filings in 8 trademark offices since 1995



Source: WPO Statistics Database

111. These are defined as including Research and Development, Publishing, Toys and Games and Software.

Table 26 presents data on registrations of industrial designs by country in 2000. The raw data suggest that Germany, China and Japan are the world leaders followed by the US, UK and France.

Further similar international comparisons can be explored. Howkins (2001 p.116) provides data on the creative industries,[111] which are reproduced in Table 27. The UK appears to have a relatively small absolute presence. However, Andari *et al.*(2007), using OECD data, argue that the UK is a world leader in the related cultural industries with a greater share of GDP accounted for by such industries than in other nations. They also note UNESCO estimates that the UK is the world's biggest exporter of cultural goods. More recent UNCTAD data however show that the UK is only fourth in the ranking of top 10 exporters of creative goods in 2005 (see Table 28).

Table 26: Registrations for industrial designs filed during 2000

Country	Reg.	Country	Reg.	Country	Reg.
Australia	4,255	France	7,694	Sweden	2,340
Austria	5,092	Germany	71,375	Switzerland	1,070
Canada	3,416	Hong Kong	2,898	UK	9,380
China	50,120	Italy	2,429	US	18,292
Denmark	1,399	Japan	38,496		
Finland	962	Spain	3,644		

Source: www.wipo.int

Table 27: International comparisons, creative industries, total sales, 1999 ($ billion)

	Global	US	UK
Advertising	45	20	8
Architecture	40	17	2
Art	9	4	3
Crafts	20	2	1
Design	140	50	27
Fashion	12	5	1
Film	57	17	3
Music	70	25	6
Performing Arts	40	7	2
TV and Radio	195	82	8
Video Games	17	5	1
Sub Total			
Publishing	506	137	16
R&D	545	243	21
Software	489	325	56
Toys and Games 55	21	2	
Total	**2240**	**960**	**157**

Source: Howkins (2001 p. 116)

Table 28: Creative goods, Top 10 exporters among developed economies, 2005 (all creative industries, arts and crafts)

Exporter	Value (fob $m)	Percentage world total	Exporter	Value (fob $m)	Percentage world total
World	335,494	100.00	UK	9,030	5.67
Developed economies	196,109	58.45	France	17,706	5.28
Developing economies	136,231	40.61	Canada	11,377	3.39
Economies in transition	3,154	0.94	Belgium	9,343	2.78
Italy	28,008	8.35	Spain	9,138	2.72
United States	25,544	7.61	Netherlands	7,250	2.16
Germany	24,763	7.38	Switzerland	6,053	1.80

Source: UNCTAD (2008 p.292)

9.3.1 Barriers to innovation

Even if one reads the above data as indicating that intervention is desirable to speed up soft innovation in the UK, the international comparisons give no reasons for innovation in the UK being slower than elsewhere. One way to approach this might be to look at the constraints that limit soft innovation in the UK.

Data from the Community Innovation Survey might be useful for this purpose – at least for comparison within Europe – but this is not without problems.

First, it has been argued above that the CIS instrument is not well designed to capture soft innovation activity. One has to either consider that soft and TPP innovations are limited by similar constraints or that, in answering the questions, respondents do not follow the guidelines strictly.

Second, most CIS responses involve self-identified constraints on innovation which are not straightforward to interpret. A basic problem is that a reported constraint (such as for example that the cost of capital is too high) may just be another way of saying that the demand curve for capital is downward-sloping (Canepa and Stoneman, 2007).

Thus, although it may be argued that the intervention is made desirable by the international comparison, the information on constraints only indicates what levers may be pulled to speed up the innovation process and does not justify that intervention *per se*.

There are many potential limits upon innovative activity

Absent alternative data on the barriers to soft innovation activity, we look at CIS data – considering the responses to be indicative rather than definitive indicators of soft innovation. There have now been several runs of the CIS in a number of European Countries. Data on barriers to innovation from the UK CIS4 also known as the 2005 UK Innovation

Table 29: Ratings of constraints faced, percentage of all enterprises, CIS4

	Not important	Low	Medium	High
Cost Factors				
Excessive perceived economic risks	50	17	20	13
Direct innovation costs too high	51	15	20	15
Cost of finance	49	20	19	12
Availability of finance	52	22	15	11
Knowledge Factors				
Lack of qualified personnel	50	23	19	8
Lack of info on technology	55	30	13	3
Lack of info on markets	55	29	13	3
Market Factors				
Market dominated by established enterprises	52	21	18	9
Uncertain demand for innovative goods or services	52	21	19	8
Other Factors				
Need to meet UK Government regulations	56	19	14	12
Need to meet EU regulations	60	18	12	10

Source: DTI (2006)

Table 30: Proportion of enterprises regarding potential barriers to innovation as 'high', UK Innovation Survey, 2007, percentage of all respondents

Size of enterprise (employees)	10–250	250+	All
Cost Factors			
Direct innovation costs too high	10	12	10
Excessive perceived economic risk	8	10	8
Cost of finance	9	7	9
Availability of finance	7	6	7
Knowledge factors			
Lack of qualified personnel	6	4	6
Lack of information on markets	2	3	2
Lack of information on technology	2	2	2
Market factors			
Dominated by established enterprises	6	7	6
Uncertain demand	5	6	5
Other factors			
UK regulations	7	7	7
EU regulations	6	5	6

Source: Robson and Haigh (2008)

Survey, are presented in Table 29. These data reveal that perceived barriers to innovation primarily relate to risks, innovation costs, cost of finance, availability of finance, lack of qualified personnel market domination and uncertainty. DTI (2006) notes that the CIS4 data also indicate that the creative industries rate most barriers higher than other industries, and although the barriers are ordered in the same way, lack of qualified personnel ranks particularly high compared with other industries.

Table 30 summarises the first findings from the 2007 UK Innovation survey, although the data do not separate out the significant part of the sample that relates to the creative industries. The proportion of respondents who gave a high rating to each category of constraint is lower than in CIS4, but cost factors are still regarded as of major significance, with market factors, regulations and labour supply also being constraining. A quarter of non-innovating firms respond that the above constraints have been strong enough to stop them from innovating, although the main reasons why firms do not innovate is that they consider it unnecessary given market-related conditions.

9.4 Policy instruments

9.4.1 Tax incentives for soft innovation

Tax incentives may reduce the costs of soft innovation

A major constraint to innovation as indicated by the CIS data is that the costs of innovation may be too high. One possible reaction to this is to provide tax incentives that reduce the costs. As argued earlier, market failures in

the innovation process that mean that private returns to innovation may be too low may call for tax incentives to be put in place.

In most countries there are already systems in place that give preferential tax treatment to R&D spending, and indeed many countries are extending these incentive schemes further.[112] From April 2000, small-to-medium-sized enterprises in the UK were given a favourable tax treatment of R&D spending, a concession later extended to larger companies.[113] To qualify, this spending must either constitute an advance in the field or resolve a scientific or technological uncertainty. Although the Government has changed the R&D tax regime since 2000, the rules almost wholly exclude expenditures on soft innovation such as design costs or the costs of making films, music, videos and games that are the equivalent in the soft innovation process to the R&D expenditure on TPP innovation.[114]

Such exclusion not only does not encourage soft innovation, but is also likely to bias firms' innovative activity away from soft innovation and towards R&D.

The government should consider extending the favourable tax treatment of R&D to soft innovation-related expenditures. Some such subsidies already exist with respect to film production.[115] In the UK, from 2007, films with budgets of up to £20 million are entitled to government subsidies worth up to £4 million a film if the film is culturally British; intended to be shown in cinemas; and at least 25 per cent of the total qualifying production expenditure is incurred on filming activities which take place within the UK. The subsidies are paid directly to producers on completion who receive a 50 per cent tax waiver on their production costs if the film makes a profit and 20 per cent of the budget if it does not. Ireland also has (a different) scheme to stimulate film production. It also has tax incentive schemes for writers and artists.[116]

In the video games sector, UK development studios are building a case for tax breaks similar to those available in countries like France and Canada. They argue that if such action is not taken swiftly, the UK games sector will decline as more studios relocate to where such incentives are in place (NESTA 2008).

Canoy *et al.* (2005) indicate that governments also intervene in the market for books through laws concerning the price of books, grants for authors and publishers, lower value-added tax, public libraries and education in order to stimulate the diversity of books on offer, increase the density of retail outlets and to promote reading. On the basis of a review of the different ways by which countries differ they suggest that there is in fact little need for government intervention (the UK now has a more laissez faire approach to the publishing industry than in most other countries).

Quite aside from whether the evidence base exists to warrant tax-based incentives for soft innovation, a critical issue is whether such incentives work in practice. Hall and Van Reenen (2000), surveying the econometric evidence on the effectiveness of fiscal incentives for R&D, describe the systems operating in different OECD countries and their impact on the user cost of R&D. They conclude that one dollar in tax credit for R&D stimulates one dollar of additional R&D (see also Griffith et al, 2001). Koga (2003) looks at the Japanese system and also finds a positive impact from tax credits.

Lokshin and Mohnen (2007) examine the impact of the Dutch R&D fiscal incentive programme, known as WBSO, on R&D capital formation. An econometric model is estimated and they find evidence that the Dutch programme has been effective in reducing the user cost of R&D and in stimulating firms' investment in R&D. Studies for New Zealand (e.g. Sawyer, 2004), the US (e.g. Wu, 2005) and Canada (e.g. Czarnitzki et al, 2004) report similar results.

Although most such studies do see some small impact of the R&D incentives, none have considered their extension to soft innovation. We can only therefore assume that such incentives could have a similar impact on soft innovation in the absence of empirical evidence.

9.4.2 Project funding

Prior to the introduction of R&D tax incentives in the UK much financial support for innovation was provided through public funding for specific projects. Such schemes became less popular as public funding of near market research has become less common and with growing dissatisfaction with civil servants 'picking winners.' With the UK in an economic downturn in 2009, there are however some signs that the government is reconsidering targeted investments in emerging high innovation sectors.[117]

112. For example, in the 2007 Finance Act, the French R&D credit is set out as having two components: a variation component equal to 40 per cent of the differential in R&D qualifying expenses between the year and the average of the two preceding years and a volume component equal to 10 per cent of the qualifying R&D expenses in that year. The total of these two components was limited to €16 million ($23.6 million). From 2008, the R&D credit is enhanced in that: the €16 million ($23.6 million) limitation is eliminated; the variation component is also eliminated but the volume component raised to 30 per cent of the qualifying R&D expenses of the year (up to €100 million of expenses, reduced to 5 per cent over this threshold); if the company has R&D credits for the first time in a relevant year (for example 2008) or has not had R&D credits in the five years preceding the relevant year, the 30 per cent rate increases to 50 per cent in the relevant year (for example 2008) and 40 per cent in the following year (2009), provided that the company is not related to an entity which benefited from the credit system in any of these preceding five years.

113. The R&D tax credits are now available to companies throughout the UK with further enhancements to the credits announced in the 2007 Budget. R&D Tax Credits are the biggest single funding mechanism for business R&D provided by government. The cost of support claimed increased from £0.4bn in 2002/03 to £0.5bn in 2003/04 and £0.6bn in both 2004/05 and 2005/06. Of the total spend to date, expenditure under the SME scheme totalled £1.01bn and claims including cash back and tax deduction totalled £0.18bn; total claims thus equated to about 18 per cent of this expenditure. Expenditure under the large company scheme totalled £5.7bn and claims £0.43bn; claims equated to about 7.5 per cent of this expenditure. See www.berr.gov.uk/dius/innovation/randd/randd-tax-credits/page11350

Project support may already exist

Although project-based policies may have declined in popularity with respect to technological innovation, project-based policies which in effect stimulate soft innovation are already in place in the UK. In England, the Arts Council[118] has invested £1.1 billion of public money from government and the National Lottery between 2006 and 2008 in supporting the Arts. The Council states that it is within its ambition that "arts and creativity will continue to play a significant part in injecting innovation and enterprise into the economy" and that the Council will contribute to developing and sustaining the creative economy by making risk investments in new work and new talent that stimulates connections between the subsidised and commercial creative industries.

The Arts Council, England further states that it will support arts education activities to foster creative thinking at all life stages; fund research and development linking arts with other aspects of the economy, such as industry and science; and invest in new business models, leadership development and in partnerships to develop creative clusters and build regional prosperity and sustainable communities.

There may be a rationale for extending such schemes within the arts and other sectors where soft innovation activities are prevalent, but there is mixed evidence on their effectiveness. From a sample of 154 Spanish R&D-active firms in 1988, Busom (2000) shows that public funding (totalling 39 per cent of all R&D in aggregate) does increase aggregate innovative effort, but in about 30 per cent of the sample it may have simply displaced or 'crowded out' private funding. Gorg and Strobl (2007) show that in a large sample of Irish manufacturing firms, small government grants increased private R&D spend in domestically owned companies but large grants reduced private R&D spending; there is no impact on foreign-owned establishments.

Lach (2002) uses data on Israeli manufacturing firms in the 1990s to show that government subsidies stimulates the R&D of small firms but has a negative effect in large firms. Aerts and Schmidt (2008) test whether public R&D subsidies crowd out private R&D investment in Flanders and Germany, using firm-level data from the Flemish and German part of the Community Innovation Surveys (CIS3 and 4). They find that funded firms are significantly more R&D-active than non-funded firms. Gonzalez and Pazo (2008) do not find crowding out effects in Spanish data either.

9.4.3 Finance for innovation

Historically, the discourse on financial barriers to innovations has tended to emphasise institutional diversity across countries. It has often been pointed out that in the UK (and the US) the market for corporate control encourages lack of trust and short-term strategic reactions to adversity, whereas the more bank-based system in the rest of Europe and Japan encourages trust-building between financiers and innovators over time and longer term strategic decision-making. But one cannot categorically say that one system is better than another. The systems are different (see Stoneman, 2001) and that difference may well decide the appropriate policy response. Thus, for example, much of the literature suggests that financial constraints are more important where there is a market for corporate control and thus policies may be needed to counteract this. On the other hand, in bank-based systems there may be a conservative behavioural bias that may merit counteraction.

In the UK, the availability and cost of finance are considered in the CIS results to be major constraining factors to innovation and probably, by implication, soft innovation. Most finance for investment in the UK comes from internal sources, but the main concern is usually taken to be the availability or cost of external sources of finance. For innovation activities, external sources may include trade credit, new equity (including venture capital) and debt of varying duration and terms. There is no reason to believe the same is not the case with soft innovation.

Government may assist in raising finance for innovation

Over the years, there have been many policy interventions intended to address the financial constraints that firms – especially SMEs – undertaking innovation. Particularly relevant are finance guarantees for SMEs and support for greater provision of venture capital. Both interventions try to make finance either cheaper or more readily available to SMEs, and these schemes are already largely open to businesses engaging in soft innovation.

Finance guarantees are exemplified by the European Investment Fund (EIF) where "loan guarantees support enterprises with growth potential with up to 1000 employees. Under this window, the EIF issues partial guarantees (directly or indirectly) to cover portfolios of loans."[119] In the UK, the Small Firms Loan Guarantee scheme provides lenders with a government guarantee against default in

114. For the purposes of the tax credit, R&D is defined as a project which seeks to, for example (a) extend overall knowledge or capability in a field of science or technology; or (b) create a process, material, device, product or service which incorporates or represents an increase in overall knowledge or capability in a field of science or technology; or (c) make an appreciable improvement to an existing process, material, device, product or service through scientific or technological changes; or (d) use science or technology to duplicate the effect of an existing process, material, device, product or service in a new or appreciably improved way (e.g. a product which has exactly the same performance characteristics as existing models, but is built in a fundamentally different manner) and will be R&D for tax purposes if the project seeks to achieve an advance in overall knowledge or capability in a field of science or technology, not a company's own state of knowledge or capability alone (see www.hmrc.gov.uk/randd).
115. See www.hmrc.gov.uk/films/reforms.htm
116. See www.citizensinformation.ie/.../tax/income-tax/exemption_from_income_tax_for_artists?
117. Peter Mandelson (2008) 'Globalisation and the role of government in Britain's economic future.' The Hugo Young Lecture, 3 December 2008.
118. See www.artscouncil.org.uk
119. See www.eif.org/Attachments/productdocs/sme_gf_summary.pdf (p.1).

certain circumstances. Its main features and criteria are: a guarantee to the lender covering 75 per cent of the loan amount, for which the borrower pays the government a two per cent premium on the outstanding balance of the loan; a guarantee of loans of up to £250,000 and with terms of between two and ten years; availability to qualifying UK businesses with an annual turnover of up to £5.6 million; availability to businesses in most sectors and for most business purposes, although there are some restrictions.[120] This scheme is open to investment in soft as well as traditional innovation.

Venture capital has been supported by national and EU-wide initiatives over a number of years intended to encourage the development of a larger early-stage venture capital industry and to boost the supply of venture capital (OECD, 1997). In the UK, the government has established Regional Venture Capital Funds, an England-wide programme to provide risk capital finance of up to £500,000 to SMEs which demonstrate growth potential. The government's intervention is designed to be the minimum necessary to stimulate private sector investors to provide small-scale risk finance for SMEs with growth potential.[121] Again, this scheme is available for busineses engaging in soft innovation.

Kaivanto and Stoneman (2007) consider a form of possible government-backed funding to support innovation, called Sales Contingent Claims (SCC)-backed finance. SCC offers firms a different risk/return profile than debt and equity instruments. It may rank higher in the firms pecking order of preferred types of financing, does not require collateral and does not entail loss of control – all characteristics that would make it attractive to many borrowers. Such finance offers loans for projects which are only repaid if the project is successful.

Kaivanto and Stoneman (2007) show that SCC-backed finance is not generally available on the private market, especially to SMEs because of the nature of the uncertainty faced by firms and investor concerns about moral hazard. High-tech SMEs undertaking innovation may face particular uncertainty. Kaivanto and Stoneman's (2007) proposal is readily extended to cover soft innovations including very risky projects in the film industry, which generally lie outside the topics usually being addressed in such discussions.

120. See www.berr.gov.uk/bbf/enterprise-smes/info-business-owners/access-to-finance/sflg/page37607

121. See www.berr.gov.uk/.../info-business-owners/access-to-finance/regional-venture-capital-funds/page37596.

9.4.4 Labour markets

Improving the availability of skilled labour is another stimulant to soft innovation

The CIS surveys suggest that the creative industries employ larger numbers of arts and science graduates, but still more constrained by the availability of skilled labour. This is one area where labour market intervention could speed soft innovation. Labour markets tend not to be free, in that they are often regulated and are heavily dependent on what decisions the government makes on education and training.

One decision policymakers must make is the balance between public investment in general and specific skills. But – in an area which is often dominated by discussion of STEM skills – our analysis suggests that investment in specific skills must also go to the skills needed for soft innovation.

9.4.5 Product market factors

More contestable markets are to be preferred

The CIS results indicate that market factors are a barrier to innovation. This reinforces the role that policymakers may have in ensuring markets are contestable. Georghiou (2007) stresses the role of government as a buyer in product markets and the possible use of procurement strategies and influence in order to lead and encourage innovation. In areas where the public sector is an important user of soft innovations, such as in buildings and architecture, digital media, advertising, public relations and health services, procurement policy can be an important lever for stimulating soft innovation.

9.4.6 Standards and regulations

Government support for standard-setting may encourage soft innovation

Inappropriate European and British regulations are highlighted in the CIS survey as significant barriers to innovation. The most relevant regulations for soft innovation are those setting standards for compatibility. David and Greenstein (1990) argue that government regulatory bodies may have an interest in standards-setting for three reasons: their responsibility for regulating a particular industry; national goals, such as protecting domestic employment or maintaining defence capabilities; and where it believes that voluntary industry-wide standardisation activities have had an effect that stifles market competition.

Much research on network externalities suggests that government intervention can solve the coordination problems which hold up industry-led standard setting. Government intervention may also follow from the observation that adoption of a good with a network externality confers a public good on all subsequent adopters.

9.5 Arts and science

These arguments on government intervention reflect a view of soft innovation that values such activities because of the economic welfare (the sum of consumer benefit and producer profit) that they generate. But there is also a viewpoint that values the arts more in terms of their intrinsic value: one can never measure the value of beauty or artistic achievement by price alone since the market price is rarely a true valuation. Art has its own inherent aesthetic value, the argument goes.

Such a view may be used as a separate basis for policy intervention. Thus, for example, the Arts Council, England states its ambition:[122]

> *To put the arts at the heart of national life and people at the heart of the arts. Our aim is for everyone in the country to have the opportunity to develop a rich and varied artistic and creative life. We will ensure that more high quality work reaches a wider range of people – engaging them as both audience and participants. We will support artists and arts organisations to take creative risks and follow new opportunities.*

This is a cultural not an economic agenda. Cultural activity is seen as the sign of a civilised society where the government should support the arts and, by implication, soft innovation. It is not our intention to debate the validity of such arguments. Instead, we argue that, even if the driving forces for government investment in the arts are as discussed, the payoffs may be greater than might have been intended. To do so, we draw parallels with the literature that: (i) distinguishes between science and technology, and (ii) which tries to value the output of science.

There is a considerable literature that attempts to distinguish between science and technology. Dasgupta and David (1994) regard science as an activity pursued by scientists in the search for self-gratification and peer esteem, whereas technology is pursued for profits. Any individual may be a technologist one day and a scientist the next depending on the driving forces behind current activities.

A useful distinction in the soft innovation field between "high art" (corresponding to science) and "the rest" (corresponding to technology) may then lessen the argument between the economic approach to soft innovation and those that advocate public support for the arts on intrinsic grounds.

High art might be driven by peer esteem and self-gratification with incentives to innovate that are less financial and more personal. On the other hand, with design, mass entertainment, and industrial soft innovation, profit and other economic incentives may be more important.

Pursuing the analogy with science also leads to a further realisation of the value of high art. Following the literature on the value of basic science, one could argue that there are other outputs from the high art process that might have value in addition to the embodied, beauty or artistic achievement. The outputs from basic research commonly listed (see Salter and Martin, 2001) are:

1. Increases in the stock of useful knowledge
2. The output of trained skilled graduates
3. New scientific instrumentation and methodologies
4. Improved networks and social interaction
5. Increases in the capacity for scientific and technological problem solving
6. The creation of new firms

Such measures of the output of scientific activity allow it to be argued that the outputs from high art, although not driven by economic incentives, similarly include increases in the stock of: (aesthetic) knowledge, skilled artists, methodologies, networks, capacity for problem solving and new economic activities.

In the UK, the Arts and Humanities Research Council (AHRC)[123] supports (university) research within a subject domain from traditional humanities subjects, such as history, modern languages and English literature, to the creative and performing arts. It funds research and postgraduate study within the UK's higher education institutions. In addition, on behalf

122. See www.artscouncil.org.uk
123. See www.ahrc.ac.uk

of the Higher Education Funding Council for England, it provides funding for museums, galleries and collections that are based in, or attached to, higher education institutions in England. It has an annual budget of more than £75 million funding about 550-600 research awards and about 1500 postgraduate awards.

The AHRC has four strategic aims: to promote and support the production of world-class research in the arts and humanities; to promote and support world-class postgraduate training designed to equip graduates for research or other professional careers; to strengthen the impact of arts and humanities research by encouraging researchers to disseminate and transfer knowledge to other contexts where it makes a difference; and to raise the profile of arts and humanities research.

The Council also sees the dissemination of the knowledge and understanding generated by arts and humanities research as a key element of their mission, capturing business interactions, which are of importance to the arts and humanities research base; knowledge transfer with a business and economic focus, as well as knowledge interaction with other audiences, including the public and voluntary sectors (see also Bakhshi, Schneider and Walker, 2008).

9.6 Conclusions

This chapter has explored policy issues relating to soft innovation. We have taken two complementary approaches. The first relies on market failure as a guide to determining where policy may be needed. One lesson from this approach is that generalised results are lacking; the theoretical case for intervention probably lies in targeted interventions where market failures can be established. We have looked at tax incentives for innovation; the optimal design of anti-trust policies; correction for missing markets; diffusion-related policies; and changes in the intellectual property regime.

International comparative performance provides an alternative rationale for intervention. However, our discussion of policy levers or instruments was based on the results of recent Community Innovation Surveys which we have argued only imperfectly capture soft innovation.

Measures we have considered include tax incentives, project funding, loan guarantee schemes, venture capital and other schemes for financing soft innovation, labour market policies, and policies orientated towards standards and compatibility, as well as policies to stimulate contestability in product markets.

Finally, we have discussed the issue of the economic benefits arising from support policies based on the intrinsic value of soft innovations. We argued that the payoff to such activities may be usefully valued by considering how science is valued.

The underlying theme throughout has been that soft innovation is important to the economy. This is not totally accepted in policy circles, although the recent Sainsbury Review of Science and Innovation in the UK (HM Treasury, 2007) shows a growing realisation of the importance of the services sector: "we need to understand better how innovation takes place in the very different industries which make up the services sector, so that the Departments for Innovation, Universities and Skills (DIUS) and for Business, Enterprise and Regulatory Reform (DBERR) can apply their current policy initiatives more effectively" (page 5).

Even with such emphasis, although some policies (such as the loan guarantee scheme and the regional venture capital schemes) may already apply to businesses investing in soft innovations, we must recognise that most other policies are not orientated towards (if they do not specifically exclude) soft innovation activities. For this, there is no justification and policy changes ought to be put in place to reflect this.

Recent policy initiatives in the UK however (see e.g. DCMS, 2008 for the creative industries) do not go far down this route. In addition to promised action on IP enforcement and a number of exploratory investigations and pilot studies, these recent initiatives involve only small sums of funding in support of collaborative research and development and some technology transfer networks. What the UK may need to consider, however, is an overhaul of innovation policies to ensure that soft innovation activities are not neglected.

In the presence of a wide and well-funded set of policies in support of technological innovation, the absence of such policies for soft innovation may not only deter potentially advantageous routes of growth and development in the economy, but also distort the transfer of resources away from soft innovation towards technological innovation where the economic return may be lower.

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Part 10: Conclusions and future prospects

In the growing academic literature on innovation, there has been much emphasis on scientific and technological, or functional innovation, largely to the exclusion of other forms of innovation. We define 'soft innovation' as a concept distinct to the technological product and process (TPP) innovation which is at the heart of OECD and other international surveys and studies of the subject, and which reflects changes of an aesthetic nature that do not rely upon changes in functionality.

Such innovation, encompassing for example new books or music or changes in product aesthetics (sight, touch, smell) can be economically important. In a global economy that is increasingly concerned with how best to stimulate innovation in order to improve growth and welfare, this extension is important for policymakers.

Soft innovation embraces aesthetic and intellectual innovation
Our concern here is thus with changes in goods and services that primarily impact on sensory or intellectual perception and aesthetic appeal rather than functional performance. Such innovation mainly concerns product innovation and product differentiation including inter alia new books, music and video games , a new advertising campaign, a new line of clothing or the redesign of a car.

There are two main types of soft innovation
We have identified two main types of soft innovation. The first involves changes in products in the creative industries, such as new books, plays, music or films. The second relates to aesthetic innovation in goods and services that are primarily functional in nature – from a new sofa design to a new car model.

Soft innovation is often related to technological innovation
Although we distinguish between 'soft' and 'technological' innovation, we recognise that they are interrelated. Many improvements in aesthetic goods are the result of new technological products and processes – personal music players and music downloads have changed the way we consume music, just as cassette tapes and CDs did for an earlier generation. In addition, soft innovation e.g. new software may stimulate the demand for functional innovation e.g. new hardware.

Novelty does not necessarily mean improved functionality
Traditional models of innovation concentrate on situations in which new products are preferred to the old by all buyers, if available at the same price (i.e. the new product is a vertical differentiated improvement). Soft innovation may instead be horizontally differentiated (the new is preferred by some and not all at the same price e.g. soluble vs. non-soluble aspirin) or even a vertical reduction in quality (e.g. budget airlines offer reduced quality in their 'no frills' packages but at a lower price).

But it is not easy to measure the full extent of soft innovation
It is difficult to measure the full extent of soft innovation, especially that part that is significant, because there are no existing measures to fully capture it. International guides to measuring innovation, such as the Oslo Manual, judge increased functionality as the key to significance rather than the impact upon market outcomes or economic welfare. Research and development and patenting activities are traditional measures of innovation, but they focus largely on the

scientific and technological to the exclusion of the aesthetic.

We propose alternatives to gain a truer picture of the extent of total innovative activity in the economy. A good proxy for the contribution of soft innovation both to consumer satisfaction and producer profits is the market share of new variants of aesthetic or aesthetically-revised products. In general, we argue that the more units sold or the greater the market share gained by the new product, the greater its significance. Using this metric, we have been able to make an assessment of the contribution of books, music and video games.

Soft innovation is prevalent outside manufacturing and employs many more people than traditional Research and Development

By taking information from a number of sources we are able to project a consistent picture of the extent of soft innovation. We use measures of innovation in the creative industries, taken from the Community Innovation Survey; core creative employment in the creative industries; creative employment in other industries; design activities in all industries; and copyright and trademark applications in the UK and Europe.

- The CIS survey responses and the design data suggest that soft innovation is extensive across the whole economy, and is particularly important outside the manufacturing sectors.

- The survey data also suggest that the rate of innovation in the creative industries is faster than in other sectors.

- The employment data suggest that seven times as many people are employed in activities encompassing both soft and TPP innovation in creative and other industries than are estimated to work in Research and Development.

Trademark applications show innovation across all sectors

A useful measure of soft innovation is an indicator of the difference between the level of trademark activity and the level of R&D or patenting activity. This shows extensive soft innovations in most industries with soft innovation apparently increasing over time. Compared with the picture of innovation painted by TPP indicators alone, innovation appears to be more balanced across different economic sectors when soft innovation is included. The availability of data on registered trademarks and design rights suggests that future macroeconomic research can be broadened beyond traditional measures.

Soft innovations can make a major market contribution

The bestselling charts for books, music and video games reveal the extent of novelty among the top sellers that account for a substantial proportion of all sales. By looking at how long bestselling books and music – which account for the majority of sales – spend in the top ten charts, we demonstrate the importance of new titles (or product variants) to the market. A slightly different pattern exists with video games (where new software is often a response to console changes) but the pattern is similar.

The extent of aesthetic innovation may be far greater than technological innovation

The extent of novelty and churn in publishing, music and video games suggests a much greater rate of innovation than occurs as traditional product and process change. The almost complete change in the top 40 music titles every two months or the failure of even some of the biggest selling video games to stay at the top of the charts for more than ten weeks suggests a much more rapid rate of innovation than the labour productivity growth rate of about 2.5 per cent per annum often quoted as a measure of the rate of technological innovation in developed economies.

But soft innovation is not confined to the creative sector, as studies of food and pharmaceuticals show

While aesthetic innovations in new creative titles may seem an obvious form of soft innovation, we also demonstrate that there are many soft innovations in industries which are typically seen as heavily reliant on scientific and technological advances, albeit apparently fewer than in the creative industries.

In the food industry, the speedy turnover in product lines and new ways of marketing the same product are more widespread than the development of wholly new product lines. The industry also responds to changing consumer preferences, as the growth of Fair Trade and organic products has shown. Much of what might be regarded as product innovation is not really about new products or processes at all; it is soft innovation, catering to people's different tastes and aesthetic preferences rather than offering different functionality.

There is also significant soft innovation in pharmaceuticals, an industry often cited as the greatest investor in science. We show that the industry exhibits much soft innovation as reflected for example in line extensions, new ways of marketing popular drugs like aspirin or even (contentiously) cheaper generic versions of branded drugs.

Soft innovation may need IPR protection but businesses often prefer less formal IPR mechanisms

Intellectual property rights can be important in ensuring that innovators are not deterred by their innovations being easily copied or appropriated by others. While patents have little relevance to soft innovation, other IPRs can be important.

Of these, copyright is costly to enforce and design rights seem to offer little protection, but registered trademarks not only protect intellectual property, they also enable goodwill and brand awareness to grow, making it easier for innovators to sell their products in other markets or at future dates.

However, surveys show that businesses often prefer less formal means of protecting their innovations, such as trade secrecy and lead times. Even so, the different formal mechanisms do offer varying degrees of protection, and where they are registered can make an important contribution to future innovation.

Soft innovation improves the profitability of companies

We show the potential market impact of soft innovation on the performance of firms using some high-profile examples, including novel and highly profitable tourist attractions like the London Eye and the Eden Project, as well as budget airlines and cosmetic surgery.

Looking at the revenue they earn provides some practical examples of the contribution of soft innovation to company performance and of the significant returns they generate. However, such innovations are not captured by traditional measures of innovation, and it is important that they are in the future.

Government should operate a level playing field with innovation incentives

Given the economic potential of soft innovation, innovation policies available for technological and scientific advances should be more readily available for soft innovation. While there is funding from organisations like the Arts Council, England often for aesthetic innovations that contribute to our general rather than our economic wellbeing, there is insufficient access to other support measures such as tax incentives, project funding, financial assistance and appropriate skills programmes. There is also limited government action to stimulate market contestability or to facilitate the setting of standards for soft innovation. Policy should embrace all innovative activity not just some of it.

Three avenues for future research

It is traditional to discuss at this stage where research might go next. There are three obvious routes. The first is more to do with promotion than research, and encompasses the dissemination of the idea that soft innovation is important, extensive and capable of economic analysis and merits considerably more attention than has been the case in the past. This is an approach that the government has taken to design activities (Cox Review, HMT, 2005).

Second, such promotion depends on having sufficient data better to measure soft innovation and its prevalence. NESTA's project to develop a new Innovation Index for the UK could be important in this regard.[124] This will require the development of new metrics.

Third, there are considerable possibilities for further analysis of soft innovation. This could involve further development of the link between models of product differentiation and innovation and further particular consideration of how to model the costs of developing new technologies.

If there are advances on these three fronts, then: (i) general knowledge of soft innovation in particular and innovation as a whole will be improved; (ii) our ability to measure, track and internationally compare the soft innovation process will be enhanced, and (iii) further progress may also be made regarding policy advice and intervention.

124. See http://www.nesta.org.uk/assets/Uploads/pdf/Policy-Briefing/measuring_innovation_policy_briefing_NESTA.pdf

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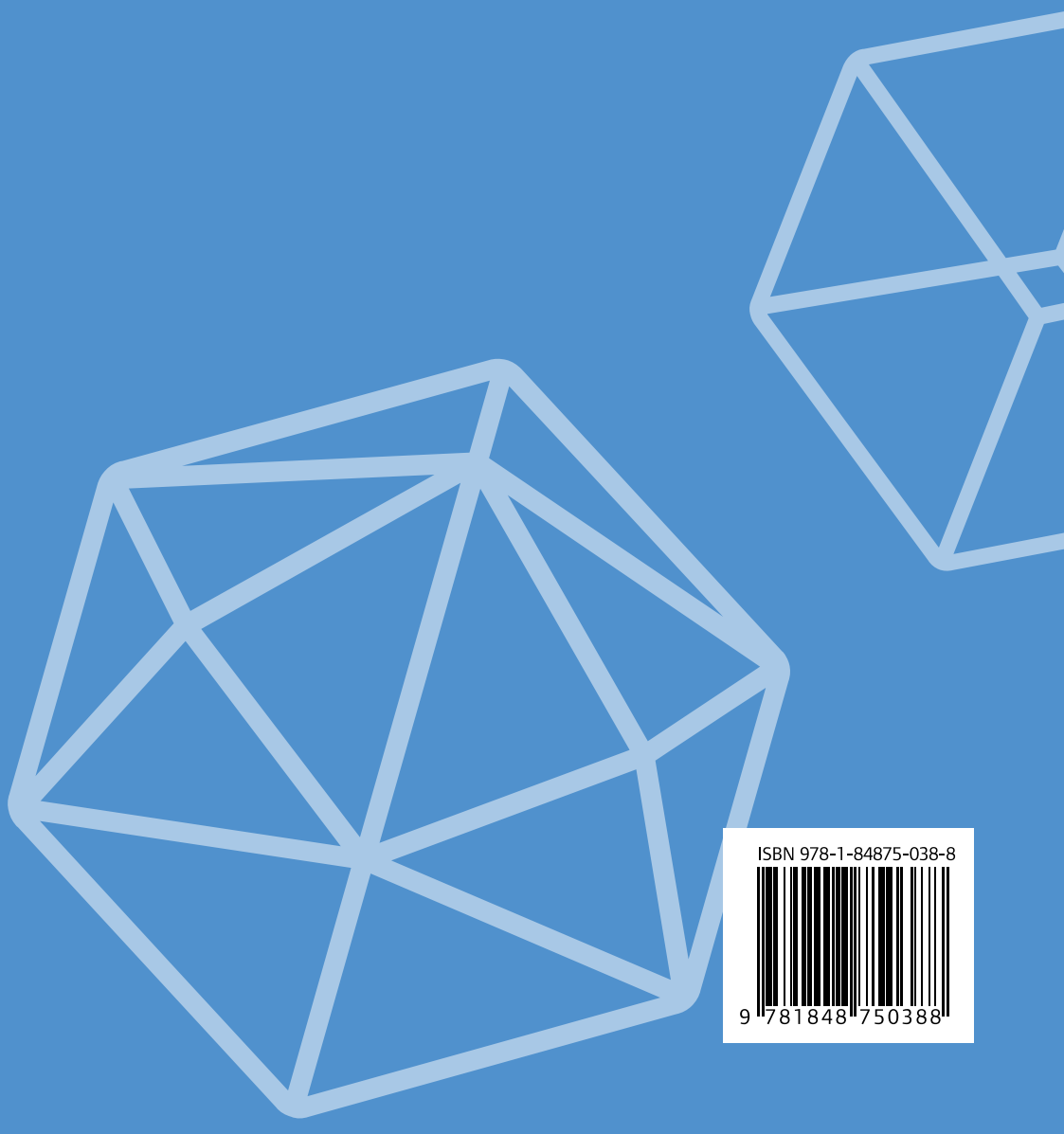

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