

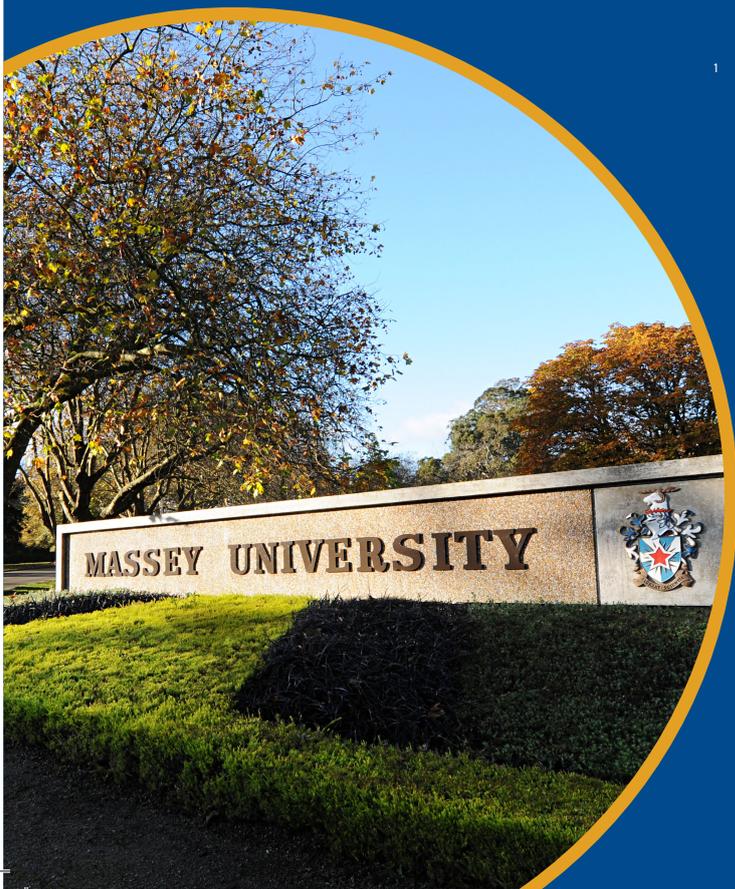
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HANS-JÜRGEN ENGELBRECHT¹

**FROM KNOWLEDGE-BASED
ECONOMIES TO UBIQUITOUS
INNOVATION SOCIETIES:
BUSINESS INNOVATION,
COMMON INNOVATION, AND
THE WELL-BEING OF NATIONS**

¹ SCHOOL OF ECONOMICS AND FINANCE,
MASSEY BUSINESS SCHOOL, MASSEY UNIVERSITY, PALMERSTON NORTH, NZ



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The Secretary
School of Economics and Finance
Massey University
Private Bag 11222
Palmerston North 4442
NEW ZEALAND
Phone: 06 356 9099 Extn 84057

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From Knowledge-Based Economies to Ubiquitous Innovation Societies: Business Innovation, Common Innovation, and the Well-being of Nations*

Hans-Jürgen Engelbrecht
School of Economics and Finance,
Massey Business School,
Massey University,
Palmerston North,
New Zealand.

ABSTRACT

It is argued that the development of increasingly diverse modes of innovation is not only broadening the scope of the knowledge-based economy, but transforming its nature, to such an extent that a new label is justified, i.e. that of the ubiquitous innovation society. There is a whole spectrum of modes of innovation, ranging from business innovation at one end to what Swann (2014) terms ‘common innovation’ at the other end. They vary in terms of closeness between innovators and users, and many other aspects. The diversity of modes of innovation also has implications for the normative assessment of innovation. Normative assessment has been mostly neglected by Schumpeter. It is argued that well-being, both in an objective and subjective sense, is the appropriate normative criterion. This increases the importance of procedural utility. A conceptual model that can be used to highlight many of the potential links and feedback effects between innovation and well-being is presented. It contains elements of the National Innovation System and Triple Helix approaches, but goes beyond them. Some potential implications for innovation policy from recognising common innovation as part of the spectrum of modes of innovation are also discussed.

Key words: Knowledge-based economy, ubiquitous innovation society, common innovation, modes of innovation, well-being.

JEL classification codes: B25, B52, D60, I31, O3.

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1. INTRODUCTION

The concept of the knowledge-based economy (KBE) tries to capture the increased importance of the creation and diffusion of economically relevant knowledge and the role of digital technologies in these processes (Foray, 2004; Godin, 2006). Foray (2004) sees the KBE as a particular historical period of economic development. Therefore, it is legitimate to inquire whether its defining characteristics still apply and to ask ‘what comes after it?’

A clue to answering this question is provided by the wide spectrum of modes of innovation that are being increasingly recognised in the innovation literature. Swann (2014) has suggested they range from *business innovation* at one end of the spectrum to *common innovation* at the other end. The latter are described as “humble innovations made by individuals, households, clubs and local communities” (ibid., p. ix). There are also many in-between modes, e.g. *user innovation* of various forms, *innovation commons*, *social innovation* etc. (Von Hippel, 2005; Phelps, 2013; Potts and Hartley, 2015; Mulgan, 2012). More often than not, the different modes overlap, at least to a certain extent. The broadening array of modes of innovation is an important characteristic of the transition from the KBE to the *ubiquitous innovation society*.

There are currently no statistics specifically on the extent of *common innovation*, but estimates for the closely related mode of *user innovation* are substantial, indicating that it is a quantitatively important phenomenon. Citing a number of sources, Stock et al. (2015) report that large numbers of individual consumers have modified and/or developed products for their own use. In the UK, this amounted to 6.1% of the population, spending an estimated total of \$5.2 billion in time and money annually on this activity. Estimates for the US are 5.2% of the population spending \$20.2 billion annually; for Japan 3.7% of the population spending \$5.8 billion annually. Stock et al. (2015) argue that innovation by individual users is a very valuable activity. It produces direct value, not only in terms of using the innovation but also in terms of hedonic benefits associated with the process of innovating. If diffused, such innovation also provides value to others. Moreover, Franke et al. (2016) argue that due to methodological shortcomings, such extant estimates of *user innovation* capture only about a quarter of *user innovation* actually taking place. They argue that *user innovation* is a mass phenomenon that deserves much more attention from policy-makers and firms.

All the different modes of innovation contribute to ‘wealth creation’. They have potentially diverse and complicated normative implications that should be explored and, if possible, captured in a normative assessment of innovation. Conceptually, such an assessment needs to be based on evolutionary considerations and avoid both the ‘long-run fallacy’ of innovation economics (the axiomatic assumption that innovation is good per se because of the undeniable long-run benefits that are realised by future generations) and the ecological fallacy of confusing micro-level analysis with systemic or societal-level analysis (both types of analysis are needed) (Engelbrecht, 2015). In an age where the assessment of ‘progress’ is recognised to have to go beyond economic criteria such as productivity and GDP (Stiglitz et al., 2009), a normative assessment of innovation should not, and cannot, be restricted to innovation undertaken by business and evaluated in only narrow economic terms.

Instead, ‘well-being’ is suggested as an appropriate normative criterion for ubiquitous innovation societies. It encompasses both objective and, at least in innovation studies so far mostly neglected, subjective dimensions (Engelbrecht, 2014a). It is also explored whether such an assessment focussed on benefits to current, not future, generations is ‘in the spirit of Schumpeter’. Schumpeter (1942 [1987, p. 83]) emphasised that it takes considerable time, i.e. decades or centuries, to reveal the ‘true features and ultimate effects’ of creative destruction. In contrast, *common innovation* and some of the other modes of innovation mostly impact on people’s well-being much more directly and immediately.

In order to highlight the multitude of potential linkages and feedback effects involved in *business innovation*, *common innovation* and other modes of innovation, a modified version of the stylized ‘back-of-the-envelope’ frameworks suggested by Swann (2009, 2014) and Engelbrecht (2014a) is proposed that explicitly incorporates households, as well as the two dimensions of well-being, as elements (among others). It is related to, and can be interpreted as, an extension of the National Innovation System and Triple Helix approaches.

Recognition of the whole spectrum of modes of innovation and the shift towards ubiquitous innovation societies has implications for innovation policy. Given the uncertainty about the impacts of any policy in an evolutionary setting, exploring the likely implications of a ‘level playing field’ for different modes of innovation seems a promising start. Policies aimed at ensuring that people have the capacity and freedom to undertake *common innovation* and other forms of *user innovation* also seem appropriate.

The paper is organised as follows. In order to highlight how ubiquitous innovation is in modern societies, Section Two discusses the spectrum of modes of innovation. Section Three argues that well-being should be used as the normative criterion for innovation. Swann’s unfamiliar normative terminology is also discussed and criticized. Section Four presents a brief exploration of Schumpeter’s views on normative issues. Section Five introduces the modified ‘back-of-the-envelope’ conceptual innovation - well-being framework. The penultimate Section Six speculates about some of the implications of *common innovation* for innovation policy. The paper finishes with concluding comments (Section Seven).

2. A SPECTRUM OF MODES OF INNOVATION

Reviewing different modes of innovation, *common innovation* and *business innovation*, which can be seen as the ends of the spectrum, are discussed first, before focussing on a (non-exhaustive) selection of other modes that have more mixed characteristics. It is highlighted how other modes differ from *common innovation*, for example in terms of closeness to users (the extent of diffusion), the role of markets, and in the extent to which ‘procedural utility’ is considered. The latter has been defined by Frey et al. (2004, p. 378) as the “noninstrumental pleasures and displeasures of processes”. Procedural utility is interpreted as the well-being component associated with processes (for example well-being impacts in the workplace). In contrast, neo-classical welfare analysis focusses on outcomes instead (outcome utility). This arguably misses the major subjective well-being (SWB) impacts of innovation (Engelbrecht, 2014a).

Common innovation

Swann uses terminology unfamiliar to most innovation researchers to describe the phenomenon he calls *common innovation*:

Common innovation is carried out by ‘the common man and woman’ for their own benefit. It takes place *quite outside* the domain of business, the professions or government. It could, indeed, be described as *non-business* innovation, to emphasise its essential difference from business innovation. It could also be called *vernacular*, as it is not intended for commercial use², but for the benefit of the innovators and their community. ... It often involves quite ordinary and unexceptional activity.

(Swann, 2014, p. 3) (Italics and superscript in the original)

In short, *common innovation*, by definition, is ubiquitous, unexceptional, non-proprietary, inexpensive and modest. Happening outside companies, organisations and markets, why should innovation studies be concerned with it? Swann argues that *common innovation*, while seemingly trivial individually, adds up to a large amount of innovation that rivals *business innovation*. Moreover, *common innovation* directly enhances people’s well-being or, in Swann’s terminology, it enhances their ‘wealth’ (this is discussed further in Section Three). Making *common innovation* and its importance visible to policy-makers should make it less likely that impacts other modes of innovation have on it, and of policies that indirectly affect *common innovation*, get ignored. Most *common innovation* can be seen as part of household production, a topic already included in the scope of economics.

Common innovation is related to the types of knowledge described as learning-by-doing, learning-by-using, and, if involving more than one individual, learning-by-interacting. It is mostly tacit and, by definition, highly localised. The primary concern is with the impact of *common innovation* on well-being, not the production of knowledge as such. These effects are of two types. One is the well-being impact of doing and learning created during the innovation process, i.e. procedural utility; the other is the well-being impact created when using, i.e. consuming, a *common innovation* (outcome utility). Both types of impacts also occur with other forms of innovation, but with *common innovation*, innovator and user are usually the same person. They are not separated by markets. Therefore, the interests of the innovator and the user are the same, and the long-run fallacy of innovation economics is avoided. This is often not the case with *business innovation*. The aim of *common innovation* is not usually diffusion, although common innovations may be copied by others. Few common innovations are likely to go any further than a single or a few individuals; they do not develop into anything else.

Another way of stating this is to say that *common innovation* is less cumulative than other forms of innovation and therefore more in the nature of a consumption good. Foray (2004, p. 16) argues that knowledge as a consumption good enables people to undertake ‘final actions’ like gardening and painting, in contrast to knowledge that enables innovations that are useful as an intellectual input in the creation of novel future actions. By being less cumulative, *common innovation* largely escapes the ‘knowledge dilemma’, that is the conflict between

requiring an incentive (in form of being able to charge a price) for new knowledge being created, and ensuring its widest use by providing it free of charge (ibid., p. 116/7).

If diffusion and profit-making are key features of the Schumpeterian view of innovation, *common innovation* may be described as ‘pre-Schumpeterian’ and pre-capitalist. In medieval China and in ancient Rome, in fact all through human history, people have engaged in *common innovation*. However, Swann (ibid., p. x) argues there are several reasons why *common innovation* is likely to grow in future, and therefore deserves our increased attention. They also support our claim of a transition from KBEs to ubiquitous innovation societies. First, with increased, and probably increasing, inequality in modern societies, *common innovation* will become more important as a source of many people’s well-being. Secondly, *common innovation* addresses people’s needs much more directly, while much of *business innovation* becomes ever more remote from people’s needs. Thirdly, *business innovation* is characterised by Schumpeterian creative destruction, whereas *common innovation* is more of a ‘gentle and benign breeze’. *Common Innovation* is about many small local initiatives. “It works by creating where there is nothing and not by undermining and destroying what is there” (ibid., p. 21). Fourthly, *common innovation* “will become an important counter-balance to the ever increasing power of business innovation, in a world where business was once the *servant* of society, but is now firmly the *master*” (ibid., p. x).

Business innovation

According to Swann (2014, p. 16) “business innovation describes those innovations undertaken by companies to increase their profits or revenues, their market share or some other strategic goal”. This general definition covers many diverse and complex processes.

The OECD’s Oslo Manual (OECD, 2005) provides guidelines for measuring *business innovation* (that is innovation at the firm level in the business enterprise sector). The latest (third) edition defines innovation as “... 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” (ibid., p. 46). From the first edition to the latest edition, the definition of innovation has not been static but has changed in line with the changing character of economies. It has broadened from an emphasis on technological innovation in manufacturing industries to include services sectors and organisational and marketing (that is non-technical) innovation.

This reflects the different *business innovation* modes that have been identified in the literature. Two ideal modes of learning and innovation derived from the innovation systems literature are the Science, Technology and Innovation (STI) mode and the Doing, Using and Interacting (DUI) mode. They are based on different types of knowledge. STI is based more on the production and use of codified knowledge and research and development (R&D), DUI on experience-based learning (Jensen et al., 2007). Their characteristics and inter-relationships have been extensively explored. The acceptance of both STI and DUI as valid innovation modes highlights that the KBE is more than the R&D system (i.e. the National Innovation System ‘in the narrow sense’).

STI and DUI are not mutually exclusive. They are present in all industries, but their relative importance varies. Parrilli and Heras (2016) argue that STI usually characterises high-tech industries and firms in pharmaceuticals, biotechnology, nanomaterials etc., whereas DUI generates a type of synthetic knowledge base that is exploited in many engineering based industries, like machine tools, shipbuilding, automotive, energy, etc. Moreover, firms that combine STI and DUI modes, that is those that use mixed strategies, are found to be more likely to innovate than firms that rely on only one or the other (Jensen et al., 2007; Parrilli and Heras, 2016). However, Jensen et al. (2007) argue there is still a bias among researchers and policy-makers towards formal R&D processes, particularly in science-based industries.

Maximising wealth or well-being for society is not the goal of firms pursuing *business innovation*, whichever mode of *business innovation* they use, although they might contribute to it. There might be only a small gain to society, but large redistributions of profits between firms. Innovators and users are different, separated by markets, and with different interests. There are potentially many different positive and negative externalities associated with *business innovation*. The familiar business-stealing, appropriability and spillover effects identified in the literature on firm entry and in endogenous growth theory (Greenhalgh and Rogers, 2010) capture only some of them. The overall impact in terms of well-being (that is for society) is not assessed. To put it in more conventional terms, from innovation, to production, to sale in the market and finally consumption, there is more to the impact of innovation than producer and consumer surplus and utility from consumption. Each step also has procedural utility impacts and there are many potential feedback mechanisms. Swann hypothesises that the further removed an innovation from its end user, the smaller its impact on 'wealth'.

Swann (2014, p. 227) puts forward the hypothesis that the relative importance of *business innovation* vis-à-vis *common innovation* for 'wealth creation' has been declining in the wake of the Great Recession and the ever more unequal distribution of material wealth, and that it is likely to continue to decline. The view that *business innovation* is exhibiting declining social value has also been put forward by Komlos (2014), but his take on the issue is somewhat different. He argues that new products are increasingly close substitutes for the ones they replace, with the latter depreciating substantially in the process of destruction. The contributions of new products to our sense of well-being are therefore most likely overstated. Moreover, citing Mokyr's (2014a) view that most technologies developed in the 20th century had unanticipated, mostly negative, side effects (or 'bite-back'), Komlos is of the opinion that the destructiveness of business innovation has increased: 'Creative destruction's gentle winds have mutated into cyclones of destruction' (Komlos, 2014). He sees a need for a new research agenda that tries to estimate all the negative externalities of innovation, regardless of the formidable challenges involved. However, Komlos does not define what he means by well-being and is silent on the issue of procedural utility, instead emphasising the impacts of innovation on Net National Product, welfare and employment.

Bottom of the pyramid or 'pro-poor' innovation

There is an increasing recognition that innovation in much of the 20th century has been 'exclusive' in the sense of producing products for high-end consumers in developed countries. Recently, there has been increased emphasis on innovation for the poor (defined,

for example, as ‘bottom of the pyramid’ (BOP) consumers on less than US\$ 2 a day) in developing countries in order to foster inclusive innovation and development (Kaplinsky, 2014; Dahlman, 2014). Dahlman (2014, p. 72) uses the following working definition for *BOP innovation*: “... an organisational and or technical novelty that is likely to be broadly diffused and have an impact on welfare and living standards of low-income households”. He explicitly states that his definition of *BOP innovation* focusses exclusively on consumption, which seems appropriate in the context of poor consumers in poor countries.

BOP innovation is largely market-driven *business innovation* that recognises the poor as a major, often under-exploited, market opportunity. It is another *business innovation* mode. However, it can originate in households and businesses. Most BOP innovations are incremental innovations (e.g. Grameen Bank and Grameen Village Phone). Some are radical innovations (e.g. Tata’s Nano car).

Dahlman suggests a new policy agenda focussed on *BOP innovation* that needs to address the following issues: Access to global knowledge, creating a well-developed technological infrastructure, supply side policies that reduce the cost of attempting innovation, developing private sector bridge institutions, demand-side policies such as prizes to stimulate innovations that address the needs of the poor, facilitating co-development between domestic, foreign, private and public actors. To achieve appropriate, locally informed public policies and programmes, he further suggests a process of search, experimentation and learning. This would be helped by documenting the diverse *BOP innovation* efforts, establishing a taxonomy of BOP innovations, and establishing procedures for diagnostic monitoring.

Grassroots innovation and mass flourishing

Another mode of innovation clearly at the business end of the innovation spectrum is Phelps (2013) *grassroots innovation and mass flourishing*. However, it shares some core elements with *common innovation*. In particular, it is widespread and it focusses on the human experience in the innovation process and the flourishing this brings:

A person’s flourishing comes from the experience of the new: new situations, new problems, new insights, and new ideas to develop and share... prosperity on a national scale — mass flourishing — comes from broad involvement of people in the processes of innovation: the conception, development, and spread of new methods and products — indigenous innovation down to the grassroots...

The human benefits of innovation are a basic product of a well-functioning modern economy – the mental stimulus, the problems to solve, the arrival of a new insights, and the rest.

(Phelps, 2013, p. vii, ix)

Phelps links this to attitudes and beliefs

... attitudes and beliefs were the wellspring of the dynamism of the modern economies. It is mainly a culture protecting and inspiring individuality,

imagination, understanding, and self-expression that drives a nation's indigenous innovation.

(Phelps, 2013, p. x)

For Phelps, flourishing is at the heart of prospering, that is he provides a new perspective on the meaning of 'prosperity of nations'. He focusses on the workplace (the importance of flourishing at work), and argues that because of a resurgence of traditional and corporatist values, the basis for *mass innovation and mass flourishing* in developed economies has weakened decades ago and needs to be restored. Phelps justifies his focus on the non-pecuniary aspects of job satisfaction as the prime determinant of flourishing as follows:

Why not go directly to the overall measure called *life satisfaction*? The answer is that we come to understand better what determines life satisfaction by studying job satisfaction on the way. It would be neglectful to study life satisfaction without studying the components: satisfaction with jobs, with family, and with economic situation ("financial satisfaction"). When we can study the sort of satisfaction that is specific to jobs and the effects that economic institutions and cultures have on it, we should prefer to start there for the sake of clarity.

Phelps (2013, p. 196/7)

Phelps's view of the importance of having the right conditions that enable creativity and flourishing at work, and thereby facilitate *business innovation*, fits easily into the frameworks of Swann (2009, 2014) and Engelbrecht (2014a), especially for contemporary society. Some parts of his analysis are, never-the-less, suspect. These are, in particular, the view that the era between 1850 and 1950 was a golden age of mass flourishing, and his very one-sided and negative view of the role of the state (Mokyr, 2014b).

Also, although job satisfaction is very important, it is only one life domain contributing to SWB (Engelbrecht, 2014a). Phelps acknowledges this, but never-the-less regards paid work as the central experience in people's lives (Phelps, 2013, 36). His contribution makes an important link between creativity, innovation and the good life, breaking out of standard welfare theory and recognising the importance of procedural utility. Where Phelps falls short is that he limits his view of *grassroots innovation and mass flourishing* to the workplace (the firm) and excludes the private sphere (the household).

Foray (2015), in fact, argues that Phelps's *mass innovation and mass flourishing*, and Swann's *common innovation*, are complementary, sharing important ideas and differing mainly in focussing on different spheres of innovation: In case of Phelps commercial innovation, in case of Swann non-commercial innovation. In both spheres, innovation is created and exploited. Both authors go beyond standard innovation economics, de-emphasise the importance of science for innovation, and emphasise that innovation comes from the grass roots, being a bottom-up activity, not a top-down phenomenon (ibid.).

User innovation

Among modes of innovation along the spectrum from *common innovation* to *business innovation*, Von Hippel's *user innovation* or *user-centred innovation* probably comes closest to *common innovation*. In fact, *common innovation* is one type of *user innovation*.

Von Hippel (2005) argues that innovation is being democratised in the sense that “users of products and services – both firms and individual consumers – are increasingly able to innovate for themselves” (ibid., p. 1). This shift has some attractive qualities. *User innovation* is a bottom-up process where users innovate to develop exactly what they want. User innovators, like common innovators, benefit directly from their innovations, a feature that sets these types of innovation apart from others. More precisely, von Hippel (2005, p. 3) defines users as “firms or individual consumers that expect to benefit from *using* a product or service ... manufactures expect to benefit from *selling* a product or a service”. The democratisation of innovation is welfare enhancing.

User innovators (and common innovators) can also benefit from innovations developed by other users that are shared freely. Von Hippel sharply contrasts this with the traditional ‘manufactured-centred innovation’, a top-down process in which firms produce products and services in a closed way, and try to prevent sharing their innovations with others by using Intellectual Property Rights protection. He sees a gradual shift, painful and difficult for manufacturers, from manufactured-centred innovation to *user innovation*, with the latter growing relatively more, but he also acknowledges *user innovation* is often a necessary complement to, and basis for, manufacturer innovation (ibid., p. 2). In fact, Baldwin and von Hippel (2011) report that quantitative studies of user innovations show that many of the most important and novel commercial product and processes were first developed by users for in-house use.

Von Hippel (2005, pp. 6/7, 60/61) also acknowledges that in cases where a user has a choice between innovating him/herself or hire a manufacturer to do so, enjoyment or learning associated with the process of innovating (a form of procedural utility) can be an important reason for user innovation. This fits well with Swann's (2014) view of ‘wealth’ creation and the view of how to measure the normative impacts of innovation proposed in Section Three below.

Although close, *user innovation* and *common innovation* are not identical, mainly because *user innovation* very often is still, or is seen to lead to, *business innovation* (Swann, 2014). For example, von Hippel (2006, p. 250/251) argues that non-diffusion of *user innovation* would be a poor use of resources from a social welfare perspective and therefore suggests a number of methods by which ‘user innovations of general interest’ should be transferred to manufactures for large-scale diffusion. Manufactures can search for innovations developed by lead users and develop them into profitable products or services; manufactures can provide users with the tools to enable them to jointly design new products and processes; user innovators could become manufactures themselves. Such methods lie outside the scope of *common innovation*.

Von Hippel (2005, p. 2) regards the continuing advances in ICTs as a major reason for the steady growth in *user innovation*. ICTs have facilitated information sharing. Information communities, of which user innovation communities are a subset (ibid., p. 167), have become more pervasive because of the spread and advances in ICTs. This, and the importance of learning as well as the often symbiotic relationship with manufacturer (i.e. business) innovation, link user innovation to Foray's (2004) definition of the KBE. However, this does not contradict the argument that KBEs are developing into ubiquitous innovation societies. It only indicates that it is an evolutionary, not drastic or revolutionary, change.

Baldwin and von Hippel (2011) extend the analysis of *user innovation* by conducting a comparative institutional analysis of three modes of innovation: producer innovation, single-user innovation, and open collaborative innovation. They find that because of technological trends, in particular rapidly falling design costs and communication costs, and the increase in modular design architectures, single-user innovation and open collaborative innovation are becoming more viable in many more areas. They expect them to grow in importance relative to producer innovation in most sectors of the economy and argue that this represents a paradigm shift with respect to innovation research, policy-making and practice.¹ However, their analysis is too limited and restrictive because they neglect procedural utility. Nevertheless, Baldwin and von Hippel's analytical framework can be used to highlight the very low costs and viability threshold of *common innovation* compared to other modes of innovation (see the Appendix).

Social production and exchange

Baldwin and von Hippel (2011) are, of course, not the only authors to argue that technological developments, particularly in ICTs, are leading to a paradigm shift, changing innovation and re-shaping markets. To give another example, Benkler (2006) has argued that a new form of economy might be emerging in which nonmarket, decentralised and non-proprietary commons-based peer production (or *social production*) and exchange of information, knowledge and culture play a central role. This has become feasible because the capital required for *social production and exchange* in the networked information economy is relatively cheap and widely distributed.

Benkler discusses the advantages of the networked information economy from a multi-disciplinary and liberal political perspective, and explains the numerous threats endangering the realisation of its potential. For the gains associated with *social production and exchange* to be realised, the institutional setup of a society has to create space for these activities. A recurring theme throughout his book is the plea to keep open access, as much as possible, to information and communication infrastructure, to existing information, knowledge and culture, and to the creation of new information, knowledge and culture. Over-regulation could strangle *social production and exchange*. Benkler articulates one possible answer to the

¹ Baldwin and von Hippel (2011) also discuss a number of hybrid innovation models that combine aspects of the three main modes of innovation. For example, 'closed collaborative innovation' (i.e. crowd-sourcing) combines aspects of open collaborative innovation (sharing of resources) and producer innovation (the end product is owned by the business sponsor).

question of what might come after the proprietary-based KBE. His approach is sub-summed by Baldwin and von Hippel (2011) under ‘open collaborative innovation’.

Social innovation

In recent years the literature on *social innovation* has expanded rapidly. Mulgan (2012) prefers a simple and short definition of *social innovation*. They are “innovations that are social both in their ends and in their means” (ibid., p. 35). In his opinion, the field of *social innovation* “covers new ideas (products, services, and models) that simultaneously meet socially recognised social needs (more effectively than alternatives) and create new social relationships or collaborations, that are both good for society and enhance society’s capacity to act” (ibid.).

Mulgan’s definition seems more appropriate than some others. For example, Phills *et al.* (2008, p. 39) make societal outcomes (social value creation) the main criterion for their definition. Social value is defined as “... benefits to the public or society as a whole – rather than private value – gains for entrepreneurs, investors, and ordinary (not disadvantaged) consumers” (ibid., p. 39). This is a rather fuzzy definition, a point also made by Borzaga and Bodini (2012). Because all innovations can create social value, Phills *et al.* (2008) definition of *social innovation*, taken up by many others (see, e.g., Richez-Battesti and Petrella, 2013), is not precise enough. Hochgerner (2013, p. 1680) states that it might even become difficult to determine what is not a *social innovation*. There is also overlap with other modes of innovation discussed earlier, for example *BOP innovation* and some forms of *user innovation*. It seems fair to say that there is still relatively little consensus regarding the definition of *social innovation*.

Like many user-innovations (and like common innovations by definition), social innovations are not necessarily driven by the profit motive (Pol and Ville, 2009). Moreover, when it comes to a normative assessment, Mulgan (2012) recognises the importance of procedural utility and argues that ‘value’ is closely related to well-being. Never-the-less, the emphasis on social relationships and collaboration suggests that *common innovation* involving only an individual innovator/user and single user innovation do not qualify as *social innovation*, even if they address recognised social needs.

Also, because *social innovation* involves social relationships, there is the possibility that not all social innovations are desirable. It has been recognised that they can have ‘a dark side’ that needs careful consideration (Pol and Ville, 2009; Nicholls and Murdoch, 2012; Hochgerner, 2013; Reinstaller, 2013). Nicholls and Murdoch (2012, p. 5) mention the following examples of negative or undesirable *social innovation*: The formation of secret societies or of extreme political parties that have socially divisive or destructive objectives and intentions; deviant or unintended social consequences (for example by excluding some groups from *social innovation*); operational failures etc. Because of the much lower emphasis on diffusion, a dark side is much less likely to occur in the case of *common innovation*.

Social economy initiated innovation and the innovation commons

Potts and Hartley (2015) argue that the social economy is a source of innovation. In their view, socio-cultural processes not only govern innovation, a fact long recognised, but they

also produce innovation. Therefore, there needs to be a place for civil society and community level solutions in information economics and innovation policy. They propose three models that might be a starting point for the “development of a distinct social economics of the endogenous process of invention and innovation ... to bring human values and social context into the study of the economics of innovation” (Potts and Hartley, 2015, p. 265).

Potts and Hartley focus on how consumers deal with novelty (through ‘social network markets’ and ‘novelty bundling markets’), how they pool information for invention and market discovery under extreme uncertainty (through ‘*innovation commons*’) and the role of culture in group formation, and hence knowledge-making. All are seen as examples of social cooperation in the presence of uncertainty to produce and process new ideas.

It should be noted that Potts and Hartley regard the *innovation commons* as an extension of both von Hippel’s *user innovation* and Benkler’s *social production and exchange*, primarily because of the emphasis on fundamental uncertainty about what will be produced and how, and its value. The *innovation commons* is “a temporary institution that forms around a particular new idea at the very beginning of an innovation trajectory where uncertainty is highest” (Allen and Potts, 2015, p. 1). In this model, the resources necessary for innovation include information about the nature of the entrepreneurial opportunity for *business innovation*. For Allen and Potts the entrepreneur is central to the definition of the *innovation commons*: It is “an emerging institution of pooled innovation resources collectively governed by entrepreneurs” (ibid., p. 9). It is “a collective action institutional solution to a fundamental part of innovation problem, namely in pooling information sufficient to reduce uncertainty to enable entrepreneurs to act” (ibid., p. 13).

The above comments make it clear that *social economy initiated innovation* envisaged by Potts and his co-authors is mostly not *common innovation*, and that it also differs from von Hippel’s single-user innovation and *social innovation*. Potts and his co-authors focus on social interactions, entrepreneurs and *business innovation*. All three of these differentiate the *innovation commons* approach from *common innovation*. In short, Potts’s (2015) view that the economics of *common innovation* is likely to be found within the economics of the *innovation commons* seems inappropriate.

3. NORMATIVE CRITERIA: FROM CORRECTING MARKET AND SYSTEM FAILURES TO ASSESSING WELL-BEING

The review of innovation modes in the preceding section indicates that in many cases it has become more difficult to clearly distinguish business from non-business and producer-centred from user-centred innovation. Such distinctions are becoming more blurred. Many innovation modes have a strong bottom-up element and many emphasise the human experience during the innovation process. This highlights the importance of providing and securing conditions that enable bottom-up participation. Baldwin and von Hippel (2011, p. 1414) have argued that research is urgently needed into the normative implications of different modes of innovation in order “to establish the basis for an appropriate balance”. Arguably, the diversity

of innovation modes and their characteristics indicates the need for a new way to assess the normative implications of innovation.

The two main approaches to assessing the normative implications of innovation are based on neo-classical economics and evolutionary economics (Nelson, 2009). Neo-classical economics assumes the economy is in equilibrium, or is transitioning to equilibrium, and its performance can be judged by how close it gets to a theoretical optimum, i.e. Pareto optimality. Policy focuses on correcting market failures, i.e. departures from the optimum. Using neo-classical welfare theory, Henkel and von Hippel (2005) argue that when user innovation is added to models that currently only assume manufacturers (i.e. business) innovation, social welfare is likely to be increased: “An innovation system where user innovation is present is welfare superior to one where it is not” (ibid., p. 74).² Given the similarities between some forms of *user innovation* and *common innovation*, this should indicate the importance of *common innovation* even to hardened proponents of neo-classical economics.

From an evolutionary perspective, the economy is always changing and unpredictable, and therefore there is no optimum (Metcalf, 2007). Performance is judged by the rate and nature of these changes. Some researchers have used measures of international competitiveness and economic growth (Lundvall, 1992) and the future development potential of the socio-economic system (Hanusch and Pyka, 2007) for this purpose. Innovation policy is supposed to be aimed at enhancing them. Others suggest a shift in focus to learning about system failures and how to prevent them (Metcalf, 2007; Dodgson et al., 2011; Smith and Leydesdorff, 2014).

Swann (2009, 2014) again uses unfamiliar terminology when discussing normative aspects of innovation. To understand his insistence on the importance of *common innovation* one has to have a clear understanding of his normative criterion. Swann (ibid.) distinguishes between mercantile wealth, that is traded or material wealth (M-wealth), and real or Ruskinian wealth (R-wealth). To Swann, this is roughly similar to the difference between material wealth versus welfare or quality of life. Moreover, “Ruskin observed that many who were wealthy in a mercantile sense were not capable of real wealth because they did not know how to turn their material wealth into real quality of life” (Swann, 2009, p. 235). Echoing the later ‘capability approach’ developed by Sen (1999), people need to have the capability to turn M-wealth into R-wealth (Swann, 2014, p. 13).

Undoubtedly, focussing on R-wealth when assessing the impacts of innovation broadens the perspective to the many facets of the quality of life that go beyond economic factors and that

² Henkel and von Hippel (2005) suggest that *user innovation* has the following positive effects on ‘social welfare’: 1. User innovations complement manufactures innovation by being different innovations (users tend to develop innovations that only they or a few may want, creating consumer surplus for themselves). 2. They also complement each other with respect to knowledge and capabilities. 3. The ‘business stealing’ effect is absent for user innovation. 4. User innovations tend to be freely revealed more often than manufacturer innovations. Arguing within the narrow framework of welfare theory, they do not mention the ‘pleasure of innovation’ (i.e. positive procedural utility), in contrast to von Hippel (2005).

are not mediated through markets. However, it would have been better to explicitly relate the concept of R-wealth to developments in SWB research. In fact, Swann (2014) acknowledges that R-wealth is similar to Aristotle's concept of eudemonia, but he is unwilling to relate R-wealth to SWB.³ He gives two reasons for this. First, he rightly rejects the term 'happiness'. It has, unfortunately, become accepted practise in the economics literature to use the term to denote all different forms of SWB, or worse, to equate them. Psychologists commonly distinguish between happiness or emotional (that is hedonic or experienced) well-being and life satisfaction (LSF) or evaluative well-being. The latter is, arguably, the currently best (and most widely available) SWB measure in the context of innovation (Engelbrecht, 2014a, 2015).⁴ Graham (2016) argues that eudemonia is implicitly captured in evaluate well-being metrics like LSF. The limited empirical evidence so far indicates that measures of eudemonia have a higher correlation with LSF than with happiness (ibid.).

Secondly, Swann prefers to label his normative criterion a form of wealth in order to reclaim the word and the term 'wealth creation' from the monopoly of business (Swann, 2014, p. 12). He argues that business does not have a monopoly on creating 'what matters to society', although it often seems to pretend it does. Never-the-less, Swann's terminology might be confusing as 'wealth' has too many economic connotations, being used in many branches of that discipline. It also seems strange to use the term 'wealth' as the umbrella term for both 'means and ends' (M-wealth and R-wealth).

Following Stiglitz et al. (2009), 'well-being' is preferable as the appropriate normative criterion for ubiquitous innovation societies. It encompassing both objective and, at least in innovation studies so far mostly neglected, subjective dimensions.⁵ Objective and subjective well-being are used as pragmatic proxies for Swann's M-wealth and R-wealth. The subjective dimension relates to the LSF impacts of innovation both as a process and as an outcome. The LSF impacts of processes are captured by the concept of procedural utility. Objective well-being encompasses objective 'standard of living' measures. Many governments are already 'going beyond GDP' to measure standards of living by objective and subjective well-being, and also base policy on such wider considerations.⁶ It might have been more appropriate if

³ Swann is not the only prominent innovation researcher to focus on eudemonia. Phelps (2013) devotes a whole chapter to 'the good life', re-interpreting Aristotle's eudemonia as 'flourishing' in the sense of 'searching, exploring, investigating, and experimenting in all areas'. Similarly, a subjective dimension was also recognised by Machlup (1984) in his broad definition of human capital. He specifically refers to 'non-pecuniary satisfactions' and psychic income, but argues they cannot be estimated (ibid., chapter 13). Of course, this was before the explosion in modern SWB research. Machlup points out that many other economists also recognised such phenomena (for example musical or artistic skills) under the label 'human consumption capital'.

⁴ OECD (2013) discusses more direct measures of eudemonia as a third type of SWB measure, besides happiness and LSF. They are currently less developed and less widely available, but the relationships between all three types of measures in the context of innovation should be an interesting area for further research.

⁵ Schubert and Binder are prominent exceptions. See Schubert (2012, 2015), Binder (2013, 2014) and the discussion in Engelbrecht (2015).

⁶ See Engelbrecht (2014b) for a brief introduction and critical assessment of New Zealand Treasury's 'Living Standards Framework'. Dalziel and Saunders (2014) are advocating the use of 'well-being economics' to transform New Zealand's 'welfare state' into a progressive 'wellbeing state', and implicitly acknowledge *common innovation*, although they do not use that term.

the subtitle of Swann's (2014) book on *common innovation* had been 'how we create the well-being of nations', instead of 'how we create the wealth of nations'.

Using well-being as normative criterion contrasts with the narrow normative assessment of the KBE by Foray (2004). For example, he argues (*ibid.*, p. 17) that "new knowledge is most often not of general value for the economy because it has been produced in a local context for particular purposes", and because it often has a broad tacit dimension. This might well be correct in terms of standard economic measures of 'social value', but it misses the direct contributions of *common innovation* to well-being.

Using well-being, both in its objective as well as its subjective dimensions, as normative criterion should also caution against privileging one aspects of well-being over the other. Both are important.⁷ They might be complements or substitutes, and either might be a necessity or a luxury. In short, how objective and subjective well-being relate to each other is context specific. Swann (2014, p. 215) expresses some of these issues as follows:

... when I say that there are necessities both in M-wealth and R-wealth, I mean that those in M-wealth poverty cannot be adequately compensated by additional R-wealth; 'you can't eat scenery'. Equally, those in R-wealth poverty cannot be compensated by additional M-wealth. The R-wealth poverty of the 'couch potato' is not solved by an even greater diet of take-away food and television ...

the question of whether M-wealth and R-wealth are or are not substitutes for each other does not have a simple answer ... M-wealth and R-wealth are *not* substitutes for each other when citizens are in M-wealth poverty or R-wealth poverty, or both. But when citizens are in M-wealth prosperity and R-wealth prosperity, the two *can* be substitutes for each other.

Assessing both M-wealth and R-wealth, or objective and subjective well-being, might reveal trade-offs that policy-makers should be aware of. How to resolve them is, ultimately, a political issue, but making them visible is a first step in addressing them.

4. BUT IS IT IN THE SPIRIT OF SCHUMPETER?

One may ask whether the emphasis on well-being as a normative criterion for assessing the impacts of innovation is 'Schumpeterian'. This seems to require a general assessment of Schumpeter's views on economic methodology and the issue of value judgement, which is beyond the scope of this paper. It might also be regarded as an unfair question, given that Schumpeter developed his theories of entrepreneurship and *business innovation* before the

⁷ This also seems to be the closest to a consensus view in the debate about the role of SWB data in cost-benefit analysis (see Graham, 2016; Adler, 2016).

widespread availability of economic data and before empirical SWB research had developed into an accepted scientific field important enough to be taken seriously by at least some policy-makers and international agencies. Here little more is done than providing some comments on Schumpeter's views, based on a few snippets of his writings. They are about his attitude towards SWB theories and his appreciation of the difficulties involved in any attempt to assess the normative implications of innovation.

From his early writings, Schumpeter seems to have been rather dismissive of normative analysis. In *The Nature and Essence of Economic Theory*, first published in 1908 when he was 25 years old, Schumpeter states

Exact economics is not a philosophy of the economic actions of humans ... We do not care about the rule of motivations, the realm of judgement.

... we do not want to look at the acting humans at all but rather only on the amounts of goods they own ... For many ends of economics in their wider and usual sense this method might not be good enough or a different one would be better; from the standpoint of pure economics, though, it is the correct one in our mind.

(Schumpeter, 1908 [2010, pp. 50, 55])

Later on, Schumpeter was particularly dismissive of English utilitarianism and the principle of Greatest Happiness for the Greatest Number, calling it unsurpassably shallow a philosophy of life (Schumpeter, 1954 [1994, p. 407/8]; also see Part II, chapter 2, and Part III, chapter 3 of the book). While more approving of Aristotle's analytical methods, Schumpeter never-the-less commented in a footnote

He ... refused assent to the pleasure-and-pain doctrines about behaviour that were gaining ground in the Greece of his day. But though he did not give a utilitarian definition of happiness, he placed the concept of happiness in the center of his social philosophy. Whoever does this has taken the decisive step and has committed the original sin: whether he then emphasizes virtue and vice or pleasure and pain is secondary -- the way is smooth from the one to the other.

(Schumpeter, 1954 [1994, p. 57])

But none of this was important to Schumpeter because he was not concerned with normative analysis. However, the quote is interesting because it indicates that Schumpeter not only conflated different SWB concepts (e.g. happiness and eudemonia), thereby displaying the same confusing inaccuracy about SWB as do most modern-day economists specialising in 'happiness research', but that he was dismissive of all of them. He also briefly mentioned Ruskin, praising his skills as an art critic, but dismissing his views on economic issues (Schumpeter, 1954 [1994, p. 403, 411]).

When discussing creative destruction as the essential feature of capitalism in *Capitalism, Socialism and Democracy*, Schumpeter emphasised that it takes a long time to reveal its ‘true features and ultimate effects’:

... since we are dealing with a process whose every element takes considerable time in revealing its true features and ultimate effects, there is no point in appraising the performance of that process *ex visu* of a given point of time: we must judge its performance over time, as it unfolds through decades or centuries. A system ... that at *every* given point of time fully utilizes its possibilities to the best advantage may yet in the long run be inferior to a system that does so at *no* given point in time, because the latter’s failure to do so may be a condition for the level or speed of long-run performance.

(Schumpeter, 1942 [1987, p. 83]; italics in the original)

This can be interpreted more as a warning against optimisation, which makes no sense from an evolutionary point of view. It also echoes the long-run fallacy of innovation economics, but this would be an unfair characterisation of Schumpeter’s views as he, of course, was well aware of the destructive impacts of innovation. However, Schumpeter recognised that any normative assessment has to go beyond objective measures:

... even if we had the means of measuring the change in technological efficiency of industrial products, this measure would still fail to convey an adequate idea of what it means for the dignity or intensity or pleasantness of human life – for all that economists of an earlier generation subsumed under the heading of Satisfaction of Wants. And this, after all, is for us the relevant consideration, the true “output” of capitalist production...

(Schumpeter, 1942 [1987, p. 66])

In the end, he seems not to have dismissed the normative issue as such, but simply given up on it because he regarded the task as hopelessly difficult:

... this does not mean that the whole social gain resulting from the enterprise goes to the entrepreneur. But the question of appraisal of social gains from entrepreneurship, absolute and relative to the entrepreneurial shares in them, and of the social costs involved in a system that relies on business interests to carry out its innovations, is so complex and perhaps even hopeless that I beg to excuse myself from entering into it.

(Schumpeter, 1947, p. 155, footnote 12)

To return to the question raised at the beginning of this section, a normative assessment of innovation based on well-being cannot be taken directly from Schumpeter’s writings. However, a normative theory of innovation that adheres to Schumpeterian principles of evolutionary change could be said to be in the spirit of Schumpeter. Schubert (2013) provides a detailed analysis of Schumpeter’s views and proposes a ‘Schumpeterian concept of well-being’ based on individualistic ‘effective preference learning’. This is contested territory. See

Engelbrecht (2015) for a critique, and a proposal for an ‘evolutionary systemic normative theory of innovation’ emphasising SWB.

5. A MODIFIED CONCEPTUAL FRAMEWORK

Swann (2009, 2014) and Engelbrecht (2014a) present general ‘back-of-the-envelope’ conceptual frameworks that can be used as focussing devices to highlight the complex nexus between their respective normative variables and innovation. Their ‘many routes to wealth creation’ approach, to quote the title of one of Swann’s (2014) chapters, emphasises the many potential linkages and feedback effects involved in a normative assessment of innovation. The selection of the inter-connected elements is a question of judgement. Even in terms of the general framework, there are differences between Swann’s earlier and later writings and Engelbrecht (2014a).⁸ Swann (2014, p. 49) suggests that (a) there is no single ‘right’ way to construct the framework, giving some leeway to personal preference, (b) the construction of the framework depends on the particular application, and (c) the most important point the framework makes is to bring out the differences in scope of analysis between ‘business innovation as seen by business’, ‘business innovation as seen by society’, and *common innovation*.

A modified conceptual framework is suggested for ubiquitous innovation societies. In order to highlight that such a framework should be seen as a synthesis and extension of existing systems approaches to innovation, rather than something completely new, it is aligned more directly to the literature on National Innovation Systems and the Triple Helix model (see, e.g., Etzkowitz and Leydesdorff, 2000). Therefore, most of the elements of the proposed framework represent the major institutions in society, i.e. the Triple Helix institutions of *business*, *university* and *government*, the institution of the *marketplace* and, most importantly, *households*. However, their scope is extended in that they are also interpreted as sources of procedural utility. For example, the *business* element includes the LSF impacts of the workplace (i.e. job satisfaction). Even the scope of the marketplace is extended. It is not only a place of exchange, but also a potential source of procedural utility, even in the absence of any transaction taking place (Swann, 2009, Ch. 19). Households are mostly missing from the National Innovation Systems framework. They are included here as an additional core element. As a major source of *common innovation*, they are a prominent part of the institutional infrastructure of the ubiquitous innovation society.⁹

⁸ In particular, Swann (2009) included *Innovation* and *Creativity & Invention* as elements. In Swann (2014), they are no longer elements but represented by links, and *education* and *arts* are added as elements. Engelbrecht (2014a) uses three elements to represent Swann’s (2009) *wealth & welfare* element: *SWB* (i.e. LSF), *objective well-being* and ‘standard’ *economic performance measures*. Moreover, there is a *consumption* element in both of Swann’s frameworks, but it is a link in Engelbrecht (2014a).

⁹ Lundvall (1992) formulates the National Innovation Systems approach as an alternative and supplementary focussing device to neo-classical economics, putting interactive learning and innovation at the centre of analysis. He recognises that innovation is a ubiquitous phenomenon in the modern economy: “In practically all parts of the economy, and at all times, we expect to find on-going processes of learning, searching and exploring, which results in new products, new techniques, new forms of organisation and new markets”

Additional elements include the natural environment (*nature*), *schooling* and the *arts*. *Nature* cannot be ignored, given concerns about environmental sustainability and insights from SWB research (for example about links between SWB and *nature*). *Schooling* captures mostly pre-tertiary education, i.e. general education. Helping students prepare for work is only one of its functions. Another one, arguably of equal if not greater relevance for well-being, is to enhance students' capabilities for *common innovation*. Following Swann (2014), the whole spectrum of the *arts* (fine, applied and industrial arts) is included as a potentially important source of *common innovation* that contributes to well-being. Including this element makes the important point that the arts impact on well-being in many diverse ways beyond their commercial impacts.

As was explained in Section Three, the normative assessment of innovation should be based on both subjective and objective well-being. This reflects the view that LSF should be an additional input into policy-making, but not the only input. Separate *LSF* and *objective well-being* elements are used in the framework. *Economic performance* is a further separate element. This is in recognition of the persistent importance of indicators such as GDP and productivity growth in the economics literature and in policy discussions. They are not used as normative criteria. Their inclusion facilitates highlighting the differences between these conventional economic performance measures and the well-being elements. Innovation is also affected by other factors not directly represented in the framework, such as the Intellectual Property Rights system and other aspects of the legal environment, and broad societal factors such as 'values' or 'culture'. They could be designated as elements in any specific application where this was regarded as important.

It should be noted that extending the Triple Helix model is not new. There are some similarities between the suggested modified framework and the Quadruple and Quintuple Helix innovation models of Carayannis and Campbell (2012) and Carayannis et al. (2012). Carayannis and Campbell (2012) add 'the public' to the Triple Helix model to create their Quadruple Helix innovation system. The public consists of "the media-based and culture-based public and civil society" (ibid., p. 13). Further, recognising that including the natural environment (*nature*) is important for making the Quadruple Helix ecologically sensitive, Carayannis and Campbell (ibid.) and Carayannis et al. (2012) add nature to create the Quintuple Helix innovation model. The various models are nested, that is the Quadruple Helix embeds Triple Helix into 'society'; the Quintuple Helix embeds Quadruple Helix into the natural environment. The modified framework proposed here goes further by explicitly adding households as an important institution for *common innovation*, by adding some other elements, and by introducing well-being as the normative criterion.

Swann (2014) finds it useful to use a matrix format to present the potentially 'everything relates to everything else' framework to highlight the connections between the different elements. This practice is followed here (see Figure 1). Comparing Figure 1 to Swann's (2014, p. 48, Figure 6.5) framework, it can be seen that *LSF* has been substituted for *R-*

(Lundvall, 1992, p. 8). He explicitly lists the main elements of a National Innovation System. Households are not among them (ibid., p. 13).

Wealth and *households* have been added. Consumption is represented by links instead of being an element. Swann's elements *health* and *socio-economic environment* are captured (at least to a certain extent) by the *objective well-being* element. Elements common to Swann (2014) and Figure 1 are *schooling/education*, *universities/science*, *business*, *marketplace*, *nature* and *arts*. The household sector has been highlighted in Figure 1 as a major source of *common innovation*. The Triple Helix institutions, the *marketplace* and *economic performance* are also shaded to indicate the focus of most past and current innovation research. In principle, any of the elements representing institutions (plus *nature*) can contribute to objective and subjective well-being,

Phelps's perspective on the prosperity of nations, that is flourishing in the sense of engagement, meeting challenges, self-expression and personal growth (Phelps, 2013), can easily be placed in this framework. It is mostly a direct effect of *business* on *LSF*, and potentially many secondary effects, for example on *objective well-being* and *economic performance*. As noted earlier, it seems that Phelps does recognise the importance of the wider framework, but wants to focus on non-pecuniary aspects of job satisfaction as the prime determinant of flourishing.

Common innovation in households results in direct effects on *LSF*, and potentially also on other elements. However, *common innovation* can also create links from any of the elements representing institutions to any of the others. Swann (2014) contains separate chapters that provide examples of *common innovation* not only originating in *households*, but also in *nature*, *schooling*, *arts*, *universities* and *health* (the latter being part of *objective well-being* in Figure 1). Moreover, to provide some insights into the multitude of potential effects, he suggests that *common innovation* can be related to elements in three different ways. It can add directly to a particular element, it can exploit other categories to enhance a particular element, or it can exploit a particular element to enhance others. For example, *common innovation* might directly enhance *nature*, it might use science knowledge (*universities*) to enhance *nature*, or it might use *nature* to enhance *schooling*.

Figure 1: The innovation – well-being framework for ubiquitous innovation societies

		Effect of:											
		LSF	Objective Well-being	Economic Performance	Business	Universities	Government	Households	Marketplace	Nature	Schooling	Arts	
Effect on:	LSF												
	Objective Well-being												
	Economic performance												
	Business												
	Universities												
	Government												
	Households												
	Marketplace												
	Nature												
	Schooling												
	Arts												

It is beyond the scope of this paper to discuss the possible links and feedback effects between elements shown in Figure 1 arising for all the different modes of innovation. This is best done using particular examples. However, it is suggested they can all be usefully investigated using the framework. Many links are discussed in Swann (2009, 2014), Phelps (2013) and Engelbrecht (2014a). For example, all nine chapters of part III of Swann (2014) are devoted to exploring forms of *common innovation* and their impacts, both within and across elements. Swann manages to provide at least some discussion for 59 out of 100 potential links indicated in his *common innovation* matrix table (ibid., Figure 25.2, p. 219) and suggests that empty cells might attract future innovators seeking to use so far unexploited links.

6. SOME COMMENTS ON INNOVATION POLICY

Innovation policy in ubiquitous innovation societies has to recognise the existence and importance of the whole spectrum of modes of innovation and the many ways in which they can contribute to well-being. This should lead to a broadening of innovation policy away from a fixation on *business innovation*. From an evolutionary perspective, ‘optimal’ or ‘best’ policies cannot be identified. The externalities, interactions and feedback effects associated

with the different modes of innovation are too numerous and too uncertain. Policy should aim at a ‘satisfactory’ performance of the innovation system, including its impacts on well-being. Given the current state of knowledge (or rather ignorance) about *common innovation*, a starting point in terms of policy would be to try and ensure a ‘level playing field’ that gives innovation modes other than *business innovation* a chance to fulfil their potential as sources of well-being.

A similar argument has already been made by proponents of *user innovation*. Von Hippel (2005, p. 111) argues that, given the extent and positive impacts of *user innovation* on welfare, it makes sense to consider how it is affected by public policy. Creation of a level playing field requires a review of Intellectual Property Rights, of policies restricting product modifications, source-biased subsidies for R&D, control over innovation diffusion channels, etc. Von Hippel assumes that if that were the case, *user innovation* would increase further in importance and increasingly substitute for, or complement, *business innovation* (ibid., p. 112). The gist of the argument is that since the time of Schumpeter, *business innovation* has been privileged and the need for Intellectual Property Rights to support this mode of innovation has gone largely unquestioned (Baldwin and von Hippel, 2011, p. 1413). Single-user innovation and open collaborative innovation in general, as well as humble *common innovation*, challenge these assumptions.

Phelps’s policy recommendations go even further and are aimed at broad societal factors (Phelps, 2013). He argues that the institutions and values that supported grass-roots innovation and the dynamism of western capitalist countries have deteriorated over time. To restore them, and to overcome ‘the crisis of the West’, current institutions and values have to change. In a sense, for Phelps, Swann’s hypothesis that *business innovation* will exhibit declining social value (Swann, 2014, p. 228) has already been confirmed. He sees government as having an important role in restoring dynamism. What is needed are people in government with understanding of how innovation is generated and how it is deterred. More specifically, Phelps argues that people in government and regulators should obtain first-hand experience in one or two industries by doing internships in order to understand and drive the institutional changes required to restore dynamism to western economies. However, it does not make sense to focus only on grass-roots *business innovation* and neglect the large amount of innovative activity undertaken by people in the form of *common innovation* that also contributes to their self-realisation (especially considering that for Phelps, self-realisation equals prosperity).

However, *common innovation*, as an ‘end of the spectrum’ mode of innovation, does have features that make it somewhat of a special case, in particular the relative unimportance of diffusion and the very direct link to well-being. This also has implications for policy. In addition to the policy changes suggested by von Hippel, policies aimed at supporting *common innovation* should focus on educating people so that they have the capability for *common innovation*. While important for everyone, it might be especially important for people temporarily or permanently excluded from paid work, and people having to rely on insecure employment in involuntary portfolio careers. The education system should not only focus on skills that might be needed in a fast changing workplace, but also foster skills needed for

common innovation and ‘R-wealth creation’. This might have implications for current education policy settings at various levels.

In addition to having the capability for *common innovation*, people must also have time for it. This points to policies fostering work-life balance for those in paid full-time employment, for example in order to avoid excessive over-time and/or commuting. Moreover, people must have the freedom to undertake *common innovation*. It must not be stifled by laws and rules. In a sense, *common innovation* is the most ‘permissionless’ form of innovation.¹⁰ Being humble innovation, one usually only has to give oneself permission (unless the activities hurt others). The key aspect of *common innovation* is that we can do it ourselves, as private persons, creating LSF and objective well-being, without having to ask others for permission.

7. CONCLUDING COMMENTS

For a number of reasons, the historical period of the KBE that is focussed mainly on learning and *business innovation* is outgrowing itself and transforming into something different, i.e. into the ubiquitous innovation society. The reasons include the further development of ICTs, digitisation, modularisation etc., that enable and enhance the viability of various user-based modes of innovation, the increased symbiotic relationships between different modes of innovation, and the recognition that in order to assess the normative implications of innovation, one has to go ‘beyond GDP’ and focus on (subjective and objective) well-being. Supporting innovation for economic growth is not the same as supporting innovation for well-being, even though the two are inter-related. Much greater importance has to be given to the role of procedural utility, and LSF in general, when analysing the different modes of innovation. This would also help counteract the long-run fallacy of innovation economics.

In this context, *common innovation* can no longer be overlooked and should be recognised as one end of the spectrum of modes of innovation. *Common innovation* occurs mostly in the private domain of individuals and can be interpreted as a form of household and/or community based humble innovation that contributes directly to people’s subjective and often also objective well-being. It could be seen as the ultimate broadening of the definition of innovation and recognition that a normative assessment of innovation should focus on outcome and procedural utility impacts associated with both market and non-market activities.

Common innovation can counteract the unavoidable, and for *long-run* economic development often undeniably necessary, short- and medium-run negative well-being impacts of Schumpeterian creative destruction, but only if we let it (that is if we ensure there is space for

¹⁰ Thierer (2014) argues that the central fault line in current technology policy debates revolves around the ‘permission question’: “Must the creators of new technologies seek the blessing of public officials before they develop and deploy their innovations?” (ibid, p. vii). While disagreeing with the view that *business innovation* should be “permissionless”, some of his core ideas are relevant in the context of *common innovation*. Indeed, “Permissionless innovation is about the creativity of the human mind to run wild in its inherent curiosity and inventiveness. In a word, permissionless innovation is about freedom” (ibid., p. 3).

it and people have the capabilities to perform it). In fact, the necessity for Schumpeterian creative destruction might be seen as a good reason for preserving and enhancing people's ability and freedom for *common innovation*.

Recognising *common innovation* and well-being as legitimate topics for innovation studies raises many questions that could be explored. For example, what are the relative contributions of the different modes of innovation to objective and subjective well-being? What is the relative importance of the different elements in the proposed innovation - well-being framework for different innovations? Under what circumstances are the different modes of innovation compliments or substitutes? What are the trade-offs between objective and subjective well-being, and which trade-offs are acceptable or not? How and under what label should policies aimed at increasing capabilities for *common innovation* be implemented? To what extent are policies needed to preserve the permissionless character of most *common innovation*, and *user innovation* more generally?

APPENDIX

Baldwin and von Hippel's (2011) analytical framework and *common innovation*

Each of the modes of innovation analysed by Baldwin and von Hippel (2011) is important and revealed to have economic advantages under some conditions (and disadvantages under others). Baldwin and von Hippel define a single-user innovator as a single firm or individual that creates an innovation for its own use, a producer innovator as a single non-collaborating firm, and open collaborative innovation as an innovation project where contributors share the work of generating a design (that is instructions on how to create a specific innovation) and reveal the outputs openly so that anyone can use them (ibid., p. 1402/3).

There are four types of generic costs involved when innovating. They are design costs (d), communication costs (c), production costs (u), and transaction costs (t). A particular mode of innovation is judged viable if the expected benefits outweigh the costs. The expected benefit (or value, V) of an innovation is "...the benefit that a party expects to gain from converting an innovation opportunity into a new design – the recipe – and then turning the design into a useful product, process, or service" (ibid., p. 1403). A mode of innovation is viable if the following holds for each contributor (the values can and usually will be different for each contributor):

$$V > d+c+u+t$$

For single-user innovation and producer innovation, this condition only has to be fulfilled for the one contributor, whereas in the case of open collaborative innovation, the equation has to hold for all (that is. multiple) contributors. Because of the rapid development of ICTs, d and c have declined greatly over time, and this is Baldwin and von Hippel's main hypothesis for why modes of user innovation have grown in importance. They assess the relative costs of each mode of innovation to determine when each is likely to be viable.

Let's consider *common innovation*. Baldwin and von Hippel regard costs of computation as the major element of design costs. This type of cost is unlikely to occur for most *common innovation*, i.e. design costs are likely to be very low or zero.

Similarly, communication costs are zero for single user innovation and for most *common innovation*. Even without ICTs, these forms of innovation would (and did) happen. This might be a reason why they are not part of the main KBE discourse. Falling communication costs have been critical to the increased viability of open collaborative innovation, and also for spreading *common innovation*.

Production costs are the costs of materials, energy and human effort. They are usually positive but low for *common innovation* (in many cases the major inputs will be human effort and time). Also, due to modularisation, production costs have fallen for open collaborative innovation projects.

Transaction costs are the cost of establishing exclusive rights over an innovation and transacting in them. They are, by definition, zero for *common innovation*, but can be positive

for single-user innovators (that is for those who seek to assert such rights over their innovations instead of freely revealing them). For producer innovators, such costs are inevitable. For open collaborative innovation, they are either zero or small (large projects often spend resources on protecting the design from misuse).

To summarise, using Baldwin and von Hippel's viability model, *common innovation* is most often characterised by very low costs. Conversely, this implies that even if expected benefits V are fairly low, *common innovation* will be viable. *Common innovation* has as very low viability threshold.

The viability of *common innovation* is likely to be even greater because Baldwin and von Hippel (2011, p. 1404) admit the possibility that "activities of design, communication, production, or exchange might be pleasurable for some agents". They argue that in such cases, the relevant cost would be negative! However, they are not interested in innovations for which the sum of all costs is negative, that is if innovation is a free good.

There seems to be some conceptual confusion in Baldwin and von Hippel's (2011) approach. For example, procedural utility might be derived from design and production activities, irrespective of the mode of innovation. This does *not* imply that design and production costs are then by definition negative, as Baldwin and von Hippel seem to assume. Logically, the benefits from procedural utility could counter other design and production costs without outweighing them. Moreover, an alternative and maybe more appropriate approach would have been to include procedural utility benefits in V , instead of interpreting them as cost reductions.

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