

# Knowledge-Based Economies, Innovation and Subjective Well-Being

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**DIAGRAM!**

# 1. The mostly separate knowledge-based economy and happiness policy discourses

- Observation 1:

Until fairly recently, the ‘mainstream’ Knowledge-Based Economy (KBE) policy discourse usually focussed on R&D and technical knowledge (‘Science and Technology’) and their contributions to economic growth.

- Knowledge - Productivity - Economic growth.
- Emphasis on learning, creativity, invention, innovation, entrepreneurship, ICTs, networks, increasing returns economics, digital products & services, etc.

- Observation 2:

There still is little explicit cross-referencing and interaction between the literatures on KBEs (including innovation), information society indicators and happiness/SWB research.

- For example: Foray (2004); Layard (2005), Diener et al. (2009), Krueger et al. (2009). See also Engelbrecht (2007, forthcoming).

- **Ultimate aim of KBEs?** SWB measures should give the knowledge policy discourse direction.
  - Knowledge is not accumulated for its own sake or for increasing material output and consumption per se, but for the purpose of increasing ‘welfare/well-being’.
  - SWB is arguably a broad welfare/well-being indicator (although the aim should not necessarily be to ‘maximise’ SWB).
  - This fits with the increasing emphasis on **non-economic** ‘objective’ (e.g. ‘Quality-of-Life’) and ‘subjective’ welfare indicators. For example:
    - Stiglitz et al.’s (2009) report commissioned by the French President.
    - Also see OECD’s “Better Life Initiative” (e.g. OECD, 2011 ‘How’s Life’? Measuring Well-Being’) and the “Better Life Index”.
    - New Zealand: Gleisner et al. (2012), *Working towards higher living standards for New Zealanders*, Treasury Working Paper 11/02, Wellington.
- There is, therefore, a need to explore the KBE-SWB nexus. However, **the relationship between innovation and happiness in KBEs is a vast and multi-faceted topic that does not lend itself to simple answers.**

## 2. Is SWB enough? Some insights from the non-mainstream KBE discourse

- Rooney et al. (2003):
  - Importance of beneficial aspects of social capital.
  - Cultural change towards sustainable consumption.
  - KBEs should be fair, equitable and just.
  - **Way forward? Add wisdom!?** Make it an explicit objective for KBEs to counter the ‘politics of urgency’ that leaves little time for **reflection and consideration**.

*“More and more knowledge is not a sensible objective ... While knowledge can be wonderful, wisdom is better ... Wise people ... know better than others and are recognized as being people who know better. This means that wisdom is a scarce and valuable social quality that should be close to the centre of knowledge-related policy debates ...”.* (Rooney et al., 2003, p. 154)

- *“Without wisdom any social or economic system is deficient ...”*  
(Rooney and McKenna, 2005, p. 308)

- The need for wisdom is also emphasized by Daly (1996), a prominent ecological economist.
- Arguably, SWB research should be an important ingredient in the quest for ‘wisdom-based’ knowledge policies! Such policies also have to ‘take human nature seriously’.
- KBEs have inherent potential to develop severe pathologies because they are, by their very nature, also ‘ignorance economies’ (Roberts and Armitage, 2008) & ‘risk economies’ (Van Loon, 2005, Kenway et al., 2006).
  - The latter focus on the possibility of unintended consequences and hazardous side effects of techno-scientific innovation in KBEs (risky frontier technologies), and the substitution of calculable risk (which can create an illusion of control) for non-calculable Knightian uncertainty.
- Ethical and moral issues of innovation (e.g. atomic energy, cloning, stem cell research)?

### 3. Some definitional issues

#### 3.1 What do we mean by the ‘material standard of living’?

- Increases in the ‘material standard of living’ are still important for increasing SWB in developed countries, despite the ‘**Easterlin paradox**’.
- Relatively new twist: Focus on **comprehensive or total wealth**, instead of GDP (due to sustainability considerations)
  - Total Wealth per capita interpreted to be a measure of social welfare and the object of the sustainable development paradigm. *“The capital approach to sustainable development”*

- World Bank's (2006) 'Millennium Capital Assessment':
  - Comprehensive or **total wealth per capita** (net present value of sustainable consumption, i.e. consumption that leaves the capital stock intact). It consists of:
    - **Natural capital** (major measurement efforts under way)
    - **Produced capital**
    - **Intangible capital** (includes Human Capital, Social Capital, Organisational Capital, Institutional Capital/Quality etc.)
      - Measured as the **residual**, but human capital and 'institutional quality' variables can explain a large part of its variation across countries.
- Expanded in World Bank (2011) to 1995 -2000 - 2005 (for 115 countries). *Change in total wealth = change in social welfare.*



# Relevance in current context?

- Change in total wealth is an alternative welfare indicator that focuses on sustainability.
- There seems to be a positive correlation between NC and SWB across countries (Engelbrecht, 2009, 2012), including highly developed countries.
  - This is in line with the views of some prominent ecological economists who argue there is a unique relationship between natural capital and life satisfaction and that a natural capital variable should be included in analyses of life satisfaction (Vemuri and Costanza, 2006).
  - This is also now being incorporated in ‘mainstream’ economics & policy; World Bank, OECD ‘Green Growth’, NZ Treasury (Living Standards Framework) and other agencies are beginning to use the ‘capital approach’ (capital stocks & flows approach).

In short, **environmental impacts** affecting sustainability, natural capital and total wealth **should be included in the context of a general model of the innovation – SWB nexus**.

## 3.2 What do we mean by ‘well-being’?

- OECD (2011), *How's Life: Measuring Well-Being*.  
‘Welfare theories take two positions with respect to subjective well-being. Welfarist theories, and in particular the “new utilitarian” approach proposed by Layard (2005), identify **subjective well-being as a measure of overall well-being, for which the various dimensions of material living conditions and quality of life are simple drivers.** Conversely, non-welfarist theories (so-called “resourcist theories”, Fleurbaey, 1996) argue that **subjective well-being represents one independent aspect of well-being alongside other dimensions, such as material living conditions, health status, human contact, etc.** This report follows the latter approach.’
- New Economic Foundation (NEF)(2011): ‘**Well-being is more than life satisfaction**’.
- UK’s Office for National Statistics ‘10 indicators of well-being’ & current consultation (Beaumont, 2011).
- NZ Treasury’s ‘Living Standards Framework’.

### 3.3 What do we mean by ‘Subjective Well-Being’?

- Two prominent SWB measures:
  - **Hedonic SWB** (‘happiness’, short-lived pleasant emotions),
  - **Eudaimonic SWB** (‘life satisfaction’, longer-term considerations of the ‘good life’ and its ethical dimensions).  
What about ‘happy life years’ (HLY)?
- Others? Subjective ill-being measures? Affect measures (positive, negative, balance)? Composite indices, e.g. ‘Happy Planet Index’ (combines HLY & ecological footprint)?
- Use of national averages or SWB of sub-groups of the workforce and population?

# What do we mean by SWB?

- Proliferation of SWB measures. Context free, group specific, life domain specific, job facet specific measures.
  - They convey different but complementary information about SWB for policy-makers and managers. Need measures of dispersion as well as central tendency.
- There is a need for multiple SWB measures. At least some should be part of an integrated system of SWB accounts.
  - How are SWB measures at different levels of aggregation related? E.g. impact of stress varies between national and individual level (Ng et al., 2009).
  - How are different domain specific measures related?

# Some issues for SWB research

- Importance of social capital for SWB (instead of for economic outcomes)(Helliwell and Putnam, 2004; Helliwell and Wang, 2009; Sarracino, 2010)?  
Social Capital (e.g. trust), overall SWB and job satisfaction (Helliwell and Huang, 2010)?  
Social capital and innovation (Akçomak and ter Weel, 2009)?
- More urgent to clarify the issues due to the increasing number of proposals to develop extensive and integrated systems of SWB accounts (Diener and Seligman, 2004; Dolan and White, 2007; Krueger et al., 2009; Stiglitz et al. 2009).
- Can SWB accounts be linked to innovation surveys?

# SWB and values in KBE

- Inglehart and Welzel, (2005): High levels of SWB in advanced KBEs are associated with a specific set of values (**'self-expression values'**) → autonomous human choice, democratic and humanistic societies. A main indicator is the **level of tolerance towards minorities**. Also emphasized by other theorists of KBEs, such as Florida (2003).
- Similarly, Ng and Ho (2006): Importance of rule of law and basic freedoms for increasing SWB in economically highly successful East Asian countries that seem to exhibit a 'happiness gap'.
- Even what are often regarded as similar developed countries are diverse with respect to their KBEs, and also with respect to beliefs and attitudes about core KBE elements. **Use of KBE-specific SWB indices?** Seems to be relatively neglected.

## 4. Major interfaces of knowledge policy and SWB policy discourses

### 4.1 Education

- Life-long education and learning in all their forms are crucial for success in and of KBEs. The ‘learning economy’.
- BUT: Education has little direct impact on happiness/SWB. It affects it indirectly through its impact on other variables (e.g. income, health and trust) (Helliwell, 2003).

## 4.2 Knowledge work

- Employment shift towards information and knowledge work.
- Drucker (1999): Biggest management challenge in the 21<sup>st</sup> century is to increase the productivity of knowledge workers.
- **Impact of work (in general) on SWB:**
  - Indirectly through generating income which enables **consumption** (the 'standard view' in economics).
  - Directly (through the **nature of work undertaken & work practices**). Can be positive or negative.
- Organisational & managerial innovations/re-engineering/changes in work practices often lead to stress and lower SWB of workers. Policies aimed at increasing SWB of workers might increase productivity (Diener and Seligman, 2004; Diener et al., 2009; Helliwell and Huang, 2010).



# Knowledge work

- The ‘human factor’ is still the crucial resource in KBEs (at least until Artificial Intelligence supersedes human intelligence!).
- Human brains can be fragile and are prone to malfunction, especially when under too much pressure.
  - **Mental health issues.** Rise in **mental disorders and illnesses** in general (Diener and Seligman, 2004; Layard, 2005; Warr, 2007; Doessel, 2007).
  - Are the rise in mental ill health and the development of KBEs coincidental or in some way causally related?
- BUT: Whether knowledge work is a source of happiness/SWB or of misery is an unsettled issue.

# Knowledge work

- Misery: Negative impact of **performance-based pay** (Layard, 2005) and of **multi-tasking enabled by ICTs** (Cohen, 2003). Literature on '**information overload**', 'cognitive overload' & similar terms (e.g. Edmunds and Morris, 2000, Eppler and Mengis, 2004).
- However, a certain level of stress can help people succeed in challenging tasks, creating '**flow**' experiences in people's working lives (Csikszentmihalyi, 1990).
- Ng et al. (2009) suggest that future research should explore how to maximise the benefits of stress without increasing its negative effects.
- While knowledge work might be bad, **unemployment** is definitely worse for SWB.
  - Low and stable unemployment must be a major policy objective (Layard, 2005).

## 4.3 Innovation

There is a long history of thought on the ‘**paradoxical aspect of innovation**’ (innovation good for wealth creation but not for well-being). For example:

- Karl Marx: Innovation central to economic development and survival of the bourgeoisie (or ‘**innovate or die**’).
- Joseph Schumpeter: Dual role of innovation – **Creative Destruction**. An important concept if we want to link innovation to SWB. Net effect?
- Ernst Friedrich Schumacher: ‘man is far too clever to be able to survive without wisdom’. Again, what is the net effect of innovation on SWB?
- Layard (2005): Science & technology the main drivers of changes in society that negatively affect happiness.
- Weehuizen et al. (2006): High levels of innovation may create stress; negative impacts on ‘mental capital’.

# Some more contrasting examples

- Brynjolfsson and Saunders (2010) on the hidden economic benefits of ITC & internet economy in the US: “... *hundreds of billions, perhaps trillions of dollars of unmeasured benefits in the economy.*”
- Coyle (2011): ICTs have greatly increased prosperity, but their economic consequences have resulted in greater social tensions, cultural fears, a pervasive sense of anxiety and uncertainty.

“This is the “**paradox of prosperity**”: that economic growth has come about through social disruptions, which are dramatic, given the radical and “general purpose” nature of the new technologies.”
- By contrast, others have argued that it is mostly over-abundance that creates stress in developed KBEs:

*“The overabundance of goods, choices, and activities not only contributes to stress by creating a sense of being pressed for time, but also produces stress and anxiety because of people’s tendency to want to make the best choice ... having too many choices due to a wealthy and modern lifestyle may actually increase feelings of stress and reduce well-being.”*

(Ng et al., 2009, p. 259)

# Two different positive views of innovation in modern economies

- Foray (2006): Limited view of the link between knowledge creation, innovation and SWB.
  - Focus on economic growth, income and employment effects, not on the direct SWB impacts of the innovation process itself (i.e. on knowledge producers, inventors, innovators).
- Phelps states that it is not the power of capitalism to create wealth that is **its distinctive merit**, but **its ability to create engaging and rewarding work due to its emphasis on innovation**, thereby enabling ‘self-actualization’ and ‘self-discovery’:

*“Thanks to its grassroots, bottom-up processes of innovation, capitalism at its best can deliver ... Chances for the mental stimulation, problem-solving, exploration and discovery required for a life of engagement and personal growth.”*

*(Phelps, 2009, p. 6)*

# Innovation ↔ SWB? Causality?

- In KBEs, causality may increasingly run from happiness/SWB to innovation. Having fun or joy as a motivating factor for creative labour:
  - Von Hippel (2005) – ‘democratizing innovation’ (**user innovation**).
  - Benkler (2006): ‘**Commons-based peer production**’ in the digital age (**‘social production’**); **crowd-sourcing**.
    - ‘Social production’ projects share creative labour and/or physical resources over the internet (examples: Seti@home, BOINC, Linux, Wikipedia etc.).
    - ‘Social production’ might be emerging as a distinct mode of resource allocation and production of information, knowledge and culture, potentially heralding a new stage in the development of KBEs.
  - More research needed into links between ‘social production’/crowd-sourcing and SWB. Does it really require little social capital, as Benkler argues?

# Some studies on the link between SWB and innovation

- Dolan, P., Metcalfe, R., Powdthavee, N., Beale, A. and D. Pritchard (2008). *Innovation and well-being*. Innovation Index Working Paper, National Endowment for Science, Technology and the Arts (NESTA), U.K., September, 29 pages.
- Kavetsos, G. and P. Koutroumpis (2011), 'Technological affluence and subjective well-being', *Journal of Economic Psychology*, 32, 742-753.
- Bryson, A., Dale-Olsen, H. and E. Barth (2009). *How does innovation affect worker well-being?*, Discussion Paper No 953, Centre for Economic Performance, London School of Economics and Political Science , 22 pages.

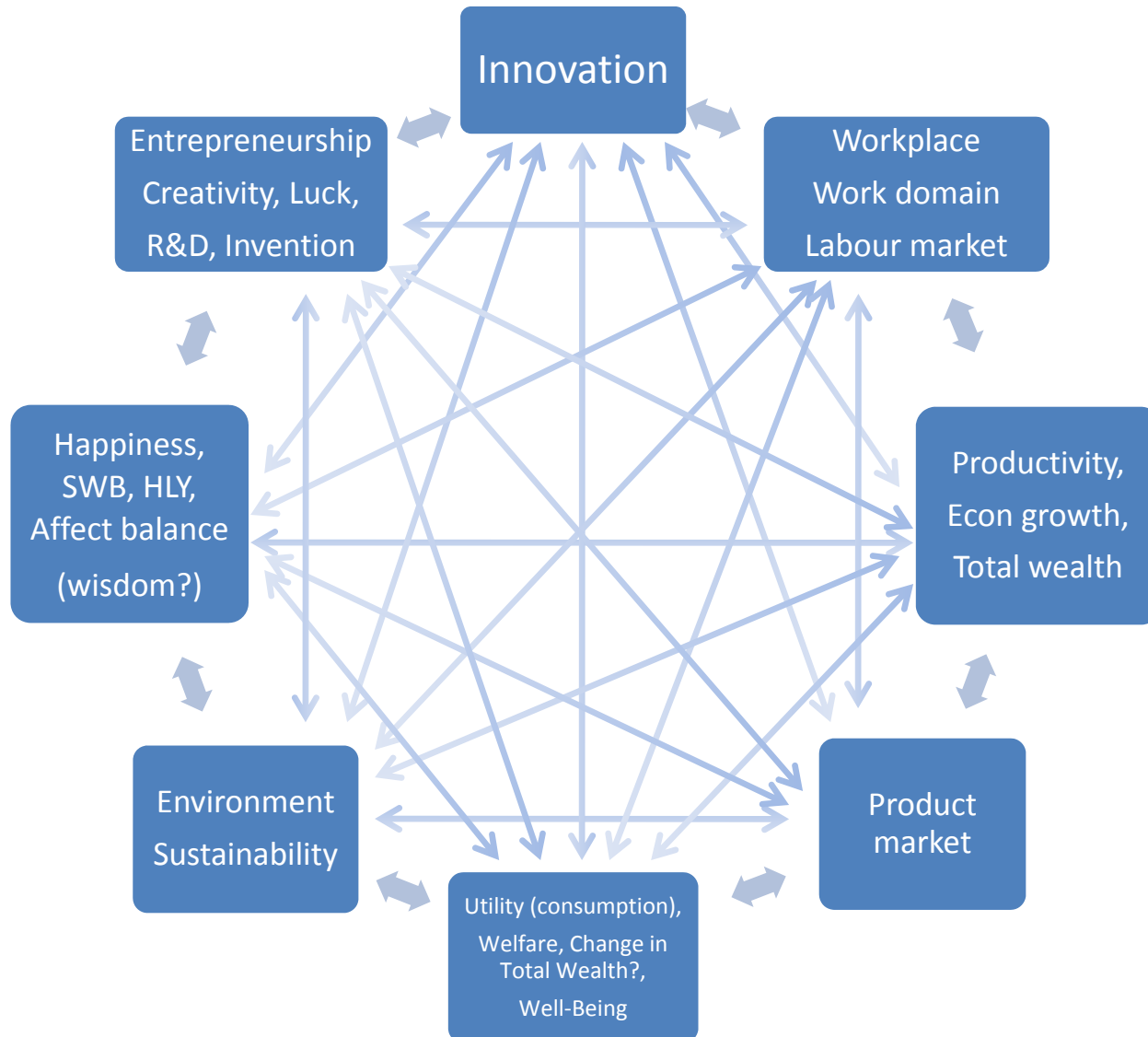
## 5. Towards a general model of the innovation – SWB nexus

- A preliminary ‘work-in-progress’ model to capture the many possible linkages between innovation and SWB (Figure 1).
- Many more linkages than discussed so far: A diagram to speak a thousand words.
  - But issues of causality and excluded variables loom large.
- Old ‘linear model of innovation’ is contained in the diagram:  
Invention → Innovation → Workplace → Product market → Consumption → Utility/Welfare.



### Figure 1: A partial “Everything relates to everything else” innovation – SWB model

(adapted from Figure 19.2 ‘Innovation and wealth creation: complex interactive model’, p. 237 in: Swann, Peter (2009), The Economics of Innovation: An Introduction, Edward Elgar, Cheltenham, UK and Northampton, MA, USA):



# Some comments on Figure 1

- The importance of each linkage will vary by:
  - **Type of innovation & technology** (e.g. ITC – General Purpose Technology, radical/incremental innovation),
  - **industry/sector affected** (agriculture/manufacturing/creative industries/other private and public services).
  - Impact of linkages can be **positive or negative** (e.g. ICT & e-waste?), and often one innovation is likely to create both. **Net effect?**
  - **Short-run versus long-run.** What is a sensible ‘long-run’?
  - **Micro versus macro level analysis?** Can both be done? Can they be combined? Domain specific and/or overall SWB indicators?

# More comments on Figure 1

- Open system, with mutual causation and feedback loops. **Other (national and international) determinants affecting each component should be added.**
  - Only some of Layard's (2005) 'big factors' affecting a person's happiness are captured in Figure 1.
  - Multitude of determinants of National and other Systems of Innovation? Public policies? Intellectual Property Rights? Etc.
  - Broader societal factors (values, norms, (in)equality)? Impact of adaptation (hedonic treadmill) and social comparison effects ('keeping up with the Joneses').
- **Many data issues.** How to proxy important concepts. Data availability will determine what can be modelled. Where are the important data gaps?
  - Can Wealth Accounting and SWB accounting be combined?

- So many issues!
- Can we agree on
  - relevant concepts and their definition?
  - the most important questions?

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