

Submission to the Innovation Task Force at the Department of the Taoiseach

from

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Introduction

This submission is made in a personal capacity.

There are many factors being addressed in submissions from many sources and this author has contributed to some. In this personal submission, I emphasise two extremely important topics addressing systemic deficiencies in our national innovation system.

These are:

- A. Irish Business Innovation Foundation (page 3)**
- B. General Education for Innovation (page 6)**

Summary

- A. Innovation is much more than science and technology. The non-technology aspects of innovation are systemically neglected and must be brought under the auspices of a dedicated body, such as the Irish Business Innovation Foundation, with responsibility to coordinate, direct and champion actions and supports for **non-technological competencies** that are essential for innovation. Failure to do this is wasteful of current budgets and impedes economic development across ALL industries: technology and non-technology, manufacturing and service.
- B. Innovation is a whole-brained, social, business process. Educational programmes and courses should encourage creativity, problem solving ability, integrative and independent thinking in students. This applies across all disciplines including Science and Technology, Arts, Humanities and Social Sciences.

See also: Appendices 1 and 2, pages 8 and 9.

I'll be happy to discuss any of these issues at greater length.

Innovation – overview

It is essential to have a clear understanding of what we should mean by 'innovation' in a national economic context.

For the average person in the street:

Innovation is "doing something new"

For the scientist or engineer:

Innovation is "inventing or discovering something new"

For the business person or economist:

Innovation is "doing something new that adds economic value through being adopted by a user"

It is this latter definition with which we must be concerned for our national innovation system. It is essentially equivalent to many definitions used by international agencies. See Appendix 1.

Note: Innovation is much more than science and technology.

The great majority of innovations do not derive directly from new technology knowledge (research).

Most innovations do not rely specifically on technology for their success.

ALL innovations require competencies other than technology to succeed.

These facts are well documented in numerous recent surveys.

“.. non-technical innovation may well be the 'missing link' that prevents Europe from taking full advantage of new technological opportunities”

(CORDIS, European Commission, *EIS commentary*, 2004)

“Innovations that sustain prosperity have a variety of forms and are developed and used through a massively multiplayer, multilevel and multiperiod game.”

(Amar Bhide, *The Venturesome Economy*, 2008)

“R&D is not the only method of innovating ... there is no detectable penalty, in terms of revenues, for firms to innovate without investing in R&D. ... the apparent bias in policy support towards R&D performing companies is not justified in terms of the growth potential of companies.”

(Based on Innobarometer survey across all 27 EU member states.

Inno-metrics (EU) Thematic Paper March 2008.)

Models of innovation

See Appendix 2 for graphical representation of two well known models of innovation, The Chain-Link Model (Kline and Rosenberg, 1986) and Doblin's Ten Types of Innovation (Larry Keeley, 1999).

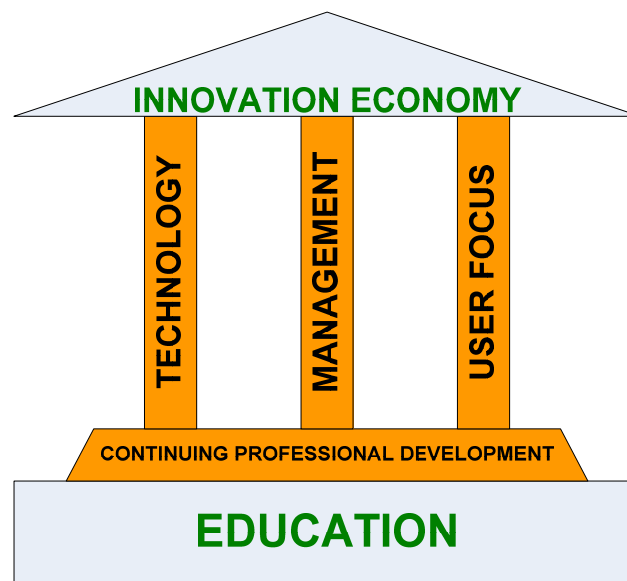
A. Business Innovation Foundation

Action areas and competencies required

Deriving from established models of modern innovation, the action areas and competencies required for business to comprehensively excel at innovation may be arranged into three groups:

- Technology (and Science)
- User Focus (Design and Marketing)
- Innovation Management

These groupings are related to the established models in the models of Appendix 2, and are represented here:



National deficiencies

1. There is excessive emphasis on developing technology-based actions and expertise.
 - a. Most government supports are oriented this way, e.g. SFI, IRCSET, Technology Development grants, R&D tax credits (technology based), etc.
 - b. Promotional messages to businesses emphasise to an **excessive extent** that new technology is the route to successful innovation.
2. Indigenous (SME) exports have underperformed compared to EU15 peers in the last decade. [Future Irish Growth: Opportunities, Catalysts, Constraints, ESRI papers, Dr. Frank Barry, 2006]
3. There is a dearth of human capital in the competence area of Innovation Management
 - a. Traditional management courses and training have not prepared the modern manager adequately for the highly dynamic, multi-disciplinary, risk-essential, uncertain environment in which innovation for growth is practised.
 - b. The newly evolved and developed best-practice processes of innovation, encompassing open-ness, multi-disciplinarity, networking, user-centricity are not easily assimilated or applied without relevant training and practice. It is particularly difficult for SMEs to engage in this training, due to lack of in-house supports and time constraints.

- c. There are not many courses available which address this human capital development requirement in a flexible, convenient manner. This applies to university-level and equivalent programmes as well as continuing professional development.
4. There is a dearth of human capital in the competence area of User Focus, most especially represented by Design and Marketing.
 - a. Design Thinking is now acknowledged as a highly effective approach to business innovation. It spreads from product design through to business model design as a core business-strategic approach. It is being adopted in many well-known businesses such as Apple, Google, Philips. Design puts the user at the centre of innovation.
 - b. Ireland is a small island, with a very small indigenous market. Most of our “innovation” is driven from externally-located MNC headquarters where marketing functions are based. The situation has not changed much since 2004 when the Forfas Enterprise Strategy Group reported (Ahead of the Curve) a serious deficiency. The ESG report said:
“Companies need to build strong relationships with individual customers, in which they develop a comprehensive understanding of the customers businesses and their problems, so that they can sell them solutions that meet or exceed their expectations.”

Some other commentary

“The results are compelling: companies that invest in design tend to be more innovative, more profitable and grow faster than those who do not. At a macro-economic level, there is a strong positive correlation between the use of design and national competitiveness.”

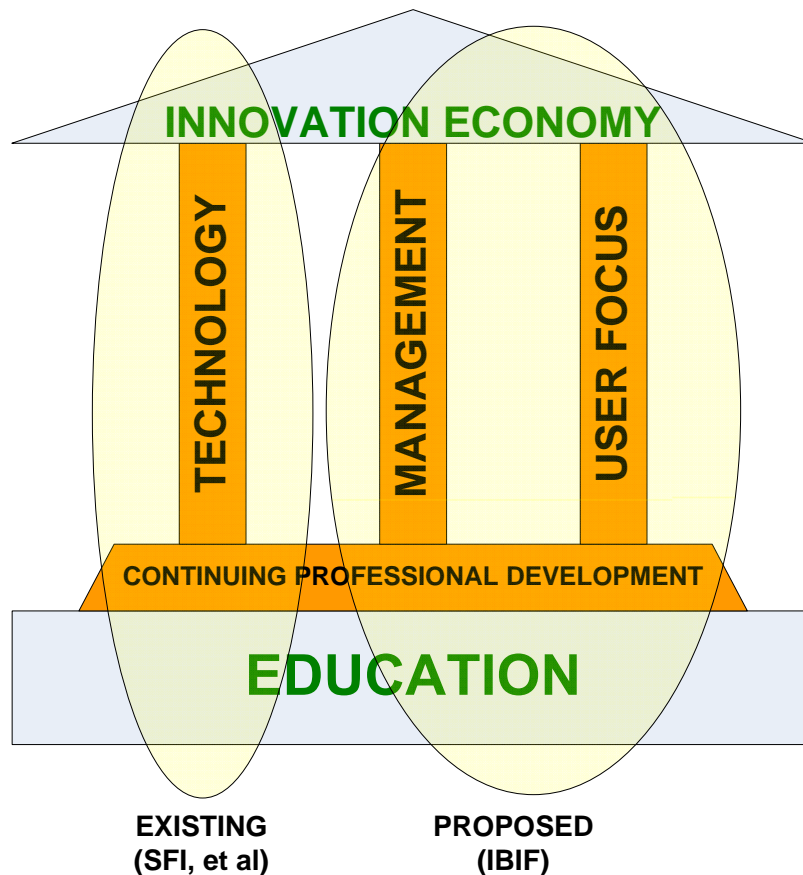
“The document concludes that design has the potential to become an integral part of European innovation policy, a building block of a policy model that encourages innovation driven by societal and user needs, and that builds on existing European strengths such as our heritage, creativity and diversity”

Design as a driver of user-centred innovation, EU Commission Staff Working Document, April 2009

(Recommendation A on next page)

Recommendation A (Irish Business Innovation Foundation)

Establish a national body (analogous to SFI) to develop competencies in Innovation Management and User-Focus disciplines. This might be called the Irish Business Innovation Foundation (IBIF).



1. IBIF will be responsible for developing and coordinating research and human capital development in Innovation Management, Design and Marketing.
 - a. A prime role will be to lead SME (and other business) leaders to engage with modern innovation processes as a route to growth. CEOs and Senior Managers must understand the benefits that all types of innovation bring to business growth.
2. IBIF will operate with a budget at around 10% of that of SFI.
 - a. Funding would be expended on programmes concerned with human capital development in the target areas, and non-technological research (e.g. unmet needs research, ethnographic research)
 - b. Naturally, in these times, this funding would be by way of re-allocation from existing funds. **There is every justification for asserting that existing technology-based programmes will be more effective and productive with, say, 90% of planned funding, when complemented by IBIF, in comparison to 100% without the IBIF functions.**
3. Returns on investment in IBIF activities are expected to be much FASTER and GREATER than those of basic science research investments.
4. IBIF areas of responsibility apply generically to ALL industry, i.e. manufacturing, service, technology based or not. They also apply to public and private organisations.
5. Given that the major part of IBIF's role is to develop human capital, its remit should be for ALL industry, whether indigenous or not.

B. General Education for Innovation

“Countries showing a higher performance in creativity and design also show, taking into account differences in per capita income, a higher innovation performance as measured by the EIS Summary Innovation Index.”

Design Creativity and Innovation: A Scoreboard approach, Inno-Metrics, EU: DG for Enterprise and Industry, February 2009

In the modern era, where user-centred innovation and open innovation practices are essential, EQ (Emotional Intelligence) is as important as IQ in the innovation process – across teams as well as within individuals.

Empathy and creativity need equal emphasis to analysis and procedure.

National deficiencies

Many commentators have argued that our education system does not produce graduates suited to perform well in a modern innovation economy. This is represented in the following points:

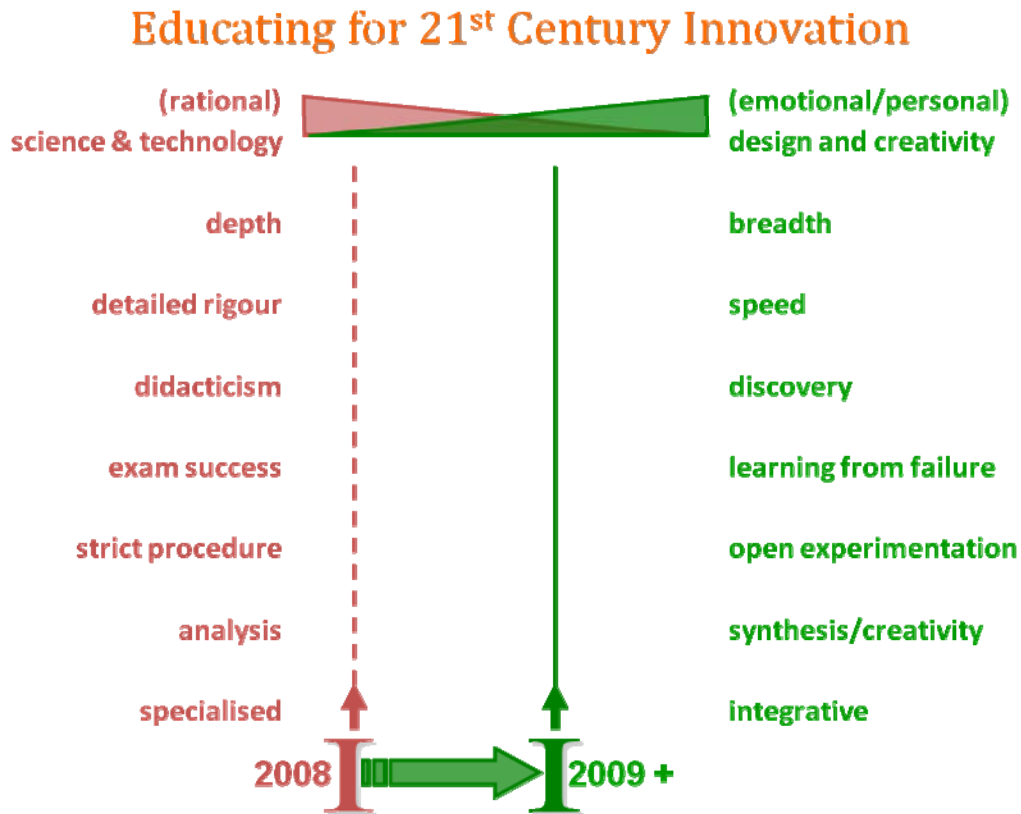
1. Specialisation: Education is predominantly delivered in isolated specialist channels. However, innovation is a whole-brained, multi-disciplinary, networked process.
2. Understanding Maths and Science is an essential outcome of a general education, for all participants in a technology based society, whether engaged with technology as a practitioner or a user. Maths and (general) science should be mandatory subjects up to Leaving Cert. However, there is no general science subject in the Leaving Cert.
3. Many educational programmes and courses do not encourage creativity, problem solving ability, integrative or independent thinking in students. This applies across many disciplines including Science and Technology, Arts, Humanities and Social Sciences.

It is often considered by default that the disciplines which alone support and drive innovation are science and technology. Also, it is often assumed and practised in education that ‘left-brained’, rational modes of thinking are most appropriate.

(Recommendation B on next page)

Recommendation B (General Education for Innovation)

Here is a diagrammatic representation of some desirable rebalancing in general education (not comprehensive).

**Specific recommendations:**

1. Establish a high-level policy group, consisting of representatives of education providers at second and third level (from various professional and 'creative' disciplines), industry (goods and services), innovation experts, education specialists (NCCA) and Department of Education and Science.
The '**Education for Innovation Policy Group**' will
 - a. Consult with industry, public employers and innovation experts regarding the skills and competencies required, and in what ratios and numbers, in an innovation economy.
 - b. Identify deficiencies and imbalances in the curricula at second and third levels.
 - c. Define and design corrective measures for implementation in the short term (1-3 years) as well as longer term.
2. Promote Transition Year at 2nd level as a year for cultivating broad creativity and innovation skills, as above.
 - a. Develop a curriculum, with supports, for use by schools.
3. Establish a subject of 'General Science' at higher level Leaving Cert
 - a. This subject syllabus will cover a broad range of 'science' topics and the scientific methods.
 - b. CAO points would apply.
4. Consider much stronger support for and promotion of the new Leaving Cert subject "**Design and Communications Graphics**", which started in 2007 with first exam 2009.
 - a. This subject shows great promise with good student interest
 - b. It has very strong relevance to innovation
 - c. It currently has a shortage of teachers and studio facilities.

Appendix 1**Some definitions and perspectives of Innovation**

- (i) **Innovation Unit**, UK Department of Trade and Industry, 2004
"Innovation is the successful exploitation of new ideas."
- (ii) Brookings Institution, USA. **Boosting Productivity, Innovation and Growth through a National Innovation Foundation (2008)**. (Quoted in Building Ireland's Smart Economy, p30.)
"[Innovation is] The creation and adoption of new products, services, technologies, and business models"
- (iii) OECD: (**Oslo Manual (2005) – Guidelines for Collecting and Interpreting Innovation Data**)
"An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations"

Note, recognising the excessive narrowness of its previously used definition around the term, "Technical Product or Process", the Oslo Manual (2005 edition) updated to the above definition, in order to better represent innovations in the variety of non-manufacturing, less R&D intensive and service industries.

The Oslo Manual is used as the guideline for the EU Community Innovation Survey and other international innovation surveys.

- (iv) The well-known **Doblin model** (1999) describes 10 types of Innovation:

Enabling Process
Core Process
Product / Service Performance
Product / Service System
Channel
Brand
Customer experience
Business Model
Networks and Alliances

- (v) Amar Bhidé ("**The Venturesome Economy, How Innovation Sustains Prosperity in a More Connected World**", November 2008) says that:

"... innovation is a massively multi-player, multi-level game ... development and effective use of innovations requires multi-player, multi-level, multi-faceted advances."

- (vi) National Standards Authority of Ireland (NSAI): **National Workshop Agreement (NWA1:2009)** describes innovation as a process (with 7 steps identified) and uses the simple definition:

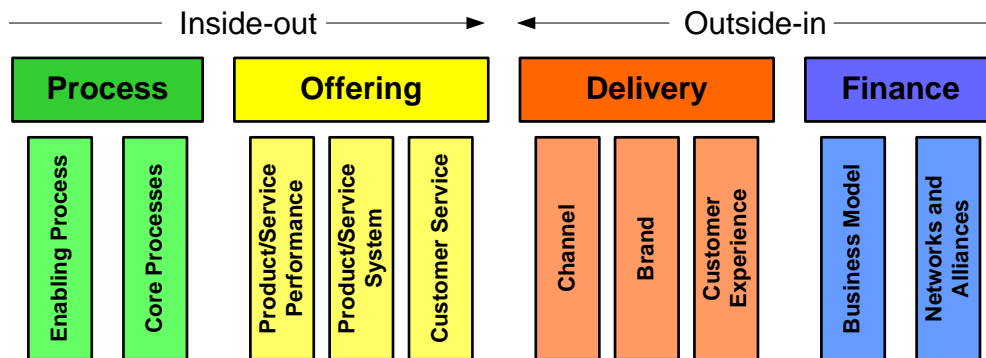
"[Innovation is] coming up with something new, that customers will adopt"

Appendix 2

Models of Innovation

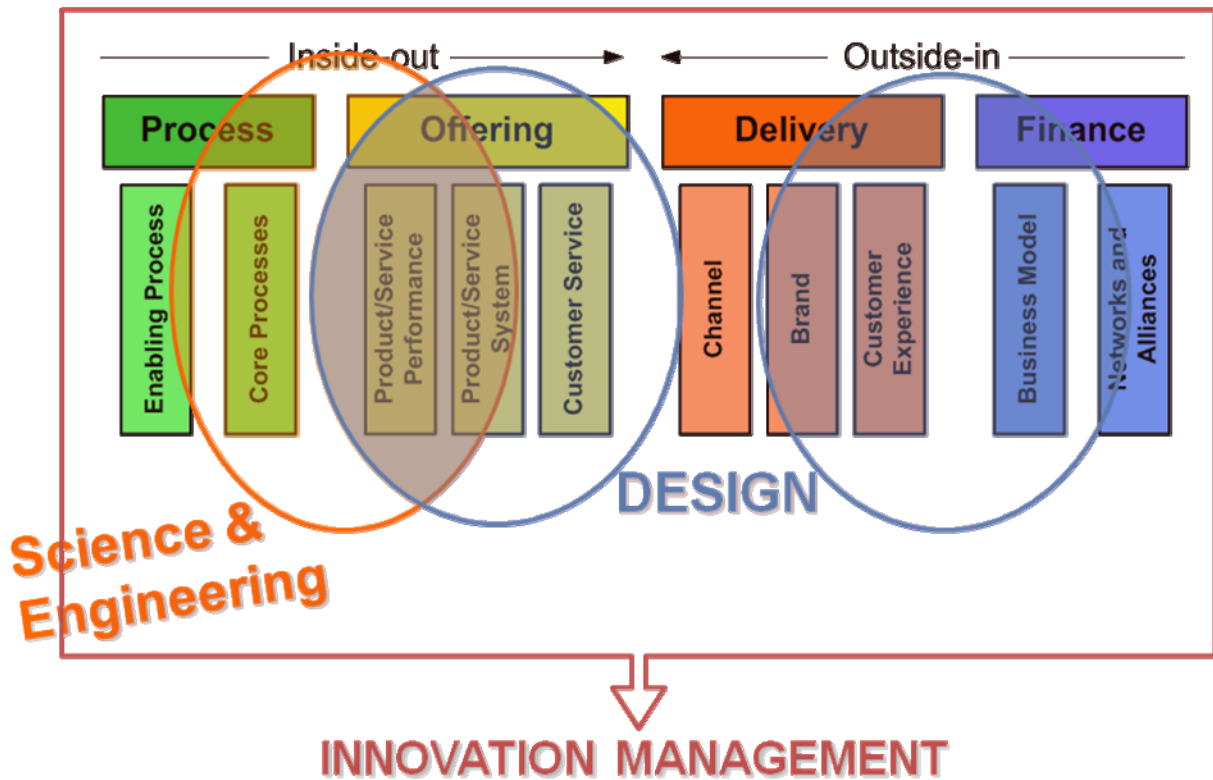
- (1) Doblin’s Ten Types of Innovation
- (2) Chain-Link Model

(1) Doblin’s Ten types of Innovation

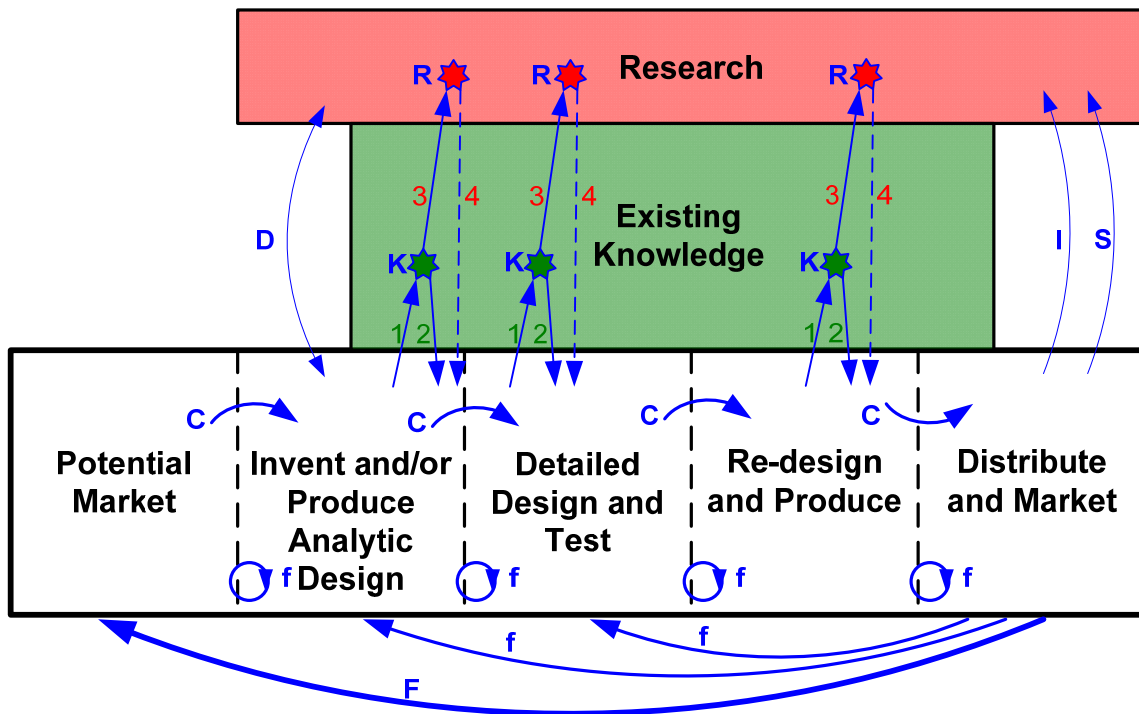


“Ten Types of Innovation”, Larry Keeley, Doblin Inc. (1999)

Identifying major competence areas (FD)



(2) Chain-Link Model of Innovation
(Kline & Rosenberg, 1986)



Identifying major competence areas (FD):

