

The relationship between innovation and entrepreneurship: easy definition, hard policy

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CORRECT CITATION FOR THIS PAPER

This is a Microsoft word format, pre-publication version of the published paper whose current citation details are:

Hindle, Kevin 2009. The relationship between innovation and entrepreneurship: easy definition, hard policy. Paper delivered to the refereed stream of the 6th *AGSE International Entrepreneurship Research Exchange*. 3-6 February. Adelaide, South Australia, Australia.

This paper won the conference award for best paper in applied entrepreneurship.

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Abstract

The paper argues that innovation is the combination of an inventive process and an entrepreneurial process to create new economic value for defined stakeholders and focuses on the policy implications of this duality. Attention is concentrated on summarising the entrepreneurial process and its importance to innovation policy and avoids any detailed elaboration of the invention process. A very brief overview of the invention process is followed by a moderately detailed summary of Hindle's (2008) model of entrepreneurial process. With an understanding and formal articulation of entrepreneurial process it becomes possible to focus on the key issues that ought to inform the development of innovation policy. These key issues are discussed and the paper concludes where it began by emphasising the need to build innovation policy on the explicit recognition that innovation results from the blending of two processes, invention and entrepreneurship, and that viable innovation policy can never be created unless entrepreneurial process is properly understood and addressed.

Key words: innovation, inventive process, entrepreneurial process

Introduction: inspiration, perspiration and confusion

The definitional issue: simplicity flows from emphasising duality

Last things first. 'Innovation' and 'entrepreneurship' are two of the most heavily discussed and least clearly defined words in the three worlds of business practice, academic research and public policy. Yet there is no reason that this should be so. This paper argues that most of the problems encountered in understanding the relationship between entrepreneurship and innovation - and particularly those unnecessary problems which infect the area of innovation policy at the national level in many countries including Australia - disappear when the following definition is adopted, understood and acted upon.

Innovation is the combination of an inventive process and an entrepreneurial process to create new economic value for defined stakeholders.

Before anyone rolls their eyes and berates the fact that yet another, possibly idiosyncratic, definition of innovation has been introduced into a space already contains far too many, I make the advance defence that what is offered here is simply an enhanced combination of three well-established definitions: two populist and one scholarly. The first two extant definitions possess the virtues and defects that attach to all clichés. The virtues include pithiness and memorability. The defects include oversimplification. For better or worse then, the argument begins by placing these homely definitions of innovation - each of which can be expressed as a simple, mock equation - squarely on the table.

In the first populist definition – I cannot make an attribution of authorship because I simply do not know its pedigree - we have the well-known equation that is so easy to remember because all three terms in it start with the letter ‘i’:

Innovation = Invention + Implementation

Overly simple though it may be, there is a great deal to like about this definition. Most importantly, it alerts us to the fact that innovation is a combination of *two* processes. Most definitional problems, philosophical arguments, verbal complexities and policy mistakes surrounding the concepts of ‘innovation’ and ‘entrepreneurship’ are correctable when we keep strongly before our eyes the realisation that innovation is a *dual* process. We often have to force ourselves to remember that two distinct sets of activities are involved in innovation: some kind of invention *and* some kind of implementation. Invention alone – the creation or discovery of new knowledge - is not sufficient to create new value. As will shortly become apparent ‘implementation’ is too imprecise a word to give a clear and full picture of what needs to happen to transform an invention into economic value. However, we can let it ride for the moment because, though it may be imprecise in detail, the word does possess the broad-brush virtue of making clear the *duality* involved in innovation. Some new knowledge has to be created and then something has to be done to make use of it or value out of it. The importance of duality for a true conception of innovation can never be overstated. Though the proportional contribution of each process to a completed innovation may vary from case to case, both ingredients of innovation must always be present to some degree.

The issue of the relative proportions pertaining to each of the two processes involved in innovation is at the very heart of the second populist formulation, whose pedigree is strongly associated with the great inventor and entrepreneur, Thomas Alva Edison:

Innovation Success = 0.01 x Inspiration + 0.99 x Perspiration

Edison is famously said to have said that success (by which he meant the successful conduct of the combined processes that result in innovation) is one percent inspiration and 99 percent perspiration. What some call ‘invention’ Edison preferred to call ‘inspiration’ and what some call ‘implementation’ Edison makes more earthy and colourful by calling it ‘perspiration’. Whichever set of terms may be used, it is clear that we are dealing with the same duality of processes. However, the great virtue Edison’s definition over the previously stated populist equation is that he gives us his view of the *proportional* importance of each of the processes that together make up innovation. In Edison’s view, ‘perspiration’ or ‘implementation’ or ‘whatever-else-we-are-going-to-eventually-call-it’ is vastly more important than invention/inspiration. It will shortly become evident that the issue of the proportional importance of the two processes involved in innovation is particularly critical when it comes to the formulation and direction of innovation policy. At this point it is more appropriate to introduce a third well-established definition of innovation: one that transcends pithy populism and resonates with both scholarly and practitioner credibility.

There exists what might be called the ‘value school’ of innovation. This is the perspective previously summarized, anecdotally, in the phrase that ‘innovation equals invention plus implementation’. More precisely, it is the school of thought that holds that innovation is the process of transforming the inherent potential that is latent in new knowledge into measurable economic value (Rogers 1962; Sundbo 1998). In this view of innovation, the essential thing that has to be done is to design a feasible transformation process. New knowledge must become new value. The

following definition of innovation is typical of the ‘value school’. It comes not from a scholar but from a practitioner, Katherine Livingstone, a woman who, at the time of penning it, was the Managing Director of Cochlear Limited, one of Australia’s most successful examples of entrepreneurial commercialisation of technology. In delivering the Warren Centre Innovation Lecture of 2000 Livingstone wrote:

I will interpret (successful) innovation as meaning ‘the process whereby new ideas are transformed, through economic activity, into a sustainable value-creating outcome’.
(Livingstone 2000: 3).

It is beyond the scope of this paper to attempt to embrace a substantial review of even a small section of the vast, multi-disciplinary literature of innovation. There are multiple perspectives on and definitions of innovation that are often closely related to the particular disciplines. However, it is perfectly safe to say that a distillation of the innovation literature in the field of management and economics reveals broad accord for the perspective summarized in Livingstone’s definition, summarising the essential features of ‘innovation’ as follows. Abstracted to a very broad level, value (wealth) creation is the output of a combination of two inputs. First, an item of new knowledge (which is often called by synonymous terms such as ‘invention’, ‘intellectual property’ etc) must be discovered or created. Second, this definition provides a clearer view – but not yet a clear enough view - of the once vague term ‘implementation’. What has to be implemented is a transformation. Innovation’s second process requires *a capacity to transform* the invented new knowledge (or selected aspects of it) into economic value.

Livingstone (2000: 3) goes on to amplify her definition of innovation by stressing the importance of the second process. She writes:

... innovation is not just the idea – innovation is only achieved when the idea has been transferred into an outcome which has value.

Livingstone’s definition of innovation, and many similar definitions in this genre enjoy and deserve wide support because they convey three main benefits.

1. They stress that the full impact of innovation is not achieved until ideas have been *transformed* into tangible outcomes. The transformation emphasis is the keystone many influential theories of innovation (Dodgson and Bessant 1996: *passim*; Dodgson 1999: *passim*; Rothwell 1992; Rogers 1962; Sundbo 1998). And it moves us from a hazy generalisation of ‘implementation’ to a clearer notion of what has to be implemented: the conversion of the value *potentially* resident in an idea to value *actually* achieved.
2. Such definitions are applicable to a public good and not-for-profit endeavours as well as to commercial outcomes.
3. Such definitions overtly emphasise the indivisible, mutual importance of good science¹ and good business. One without the other means innovation is incomplete.

¹ This paper takes a catholic view of the meaning of ‘science’. Here, it means simply ‘knowledge’ of all kinds and is in no way limited to ‘high technology’ or even ‘technology’. New knowledge could be as simple as an act of recognition as articulated by Mitchell (2000: 7).

The Livingstone definition not only comports with but improves on the two durable clichés and is compatible with most of the prevailing innovation literature from many disciplines. The common theme stresses innovation as a value creating process (Dodgson 1999). However, the definition could be and should be sharpened further. There remains a need to distinguish with still greater clarity the nature of the second, transformational process that the old platitude calls ‘implementation’, that Edison called ‘perspiration’ and that Livingstone and others call ‘transformation’ and that yet others call ‘commercialization’. All of these terms share a common weakness. They are too vague and not comprehensive enough to describe with any precision the second key process in the innovation duality. They tell us what has to be done, but not how. The precise term, to replace the vaguer ones, as will be elaborated shortly, is ‘entrepreneurship’. An understanding of entrepreneurial process will tell us not just what has to be done to transform an invention into economic value, but how. And having conquered ‘what’ and ‘how’, we should never forget ‘who’. Every innovation is designed for the benefit of specific stakeholders, (though its introduction may have spillover effects to a wider range of beneficiaries). So, properly understood and formulated, the second component of the innovation duality can now be clearly rather than vaguely incorporated in the definition. The fact that both invention and entrepreneurship ought to be conceived as processes can be made explicit. And the fact that innovation is generated to create value for specific beneficiaries can be acknowledged. This produces the definition with which the paper began:

Innovation is the combination of an inventive process and an entrepreneurial process to create new economic value for defined stakeholders.

Before providing amplification upon the nature of both the inventive and entrepreneurial processes, I first turn to an initial exposition of the reason that innovation policy is such an unnecessarily problematic area of public policy.

The policy problem: inspiration is more attractive than perspiration

Memorably summarized by Edison and supported by a large and increasing body of evidence, we know that the implemenatational/perspirational/transformational/entrepreneurial process is proportionally far more important than the inventive/inspirational process for successful innovation. Edison’s famous proportion of 99 to one in favour of the relative importance of the entrepreneurial process over the invention process may initially seem to be overstated for dramatic effect, but hard evidence shows that it contains less dramatic licence and more demonstrable reality than many may think. I (Hindle 2002: 52) have previously cited Rothwell (1992) and Dodgson and Bessant (1996) among others when summarising the evidence of the relative importance of the invention and entrepreneurship processes to innovation. I summarised the evidence (Hindle 2002: 51) that, for proponents of the value school of innovation:

... the development of the new knowledge embodied in an idea with commercial potential, represents, at most, about ten percent of the journey in any full innovation process. The other ninety percent of effort involves matching the new idea to a market need in order to create value. The ability of management to transform the potential of a new idea into an outcome that results in value creation and sustainability is the crucial determinant of the innovation process and deserves to be a central concern of innovation policy.

How wrong it would seem to be, then, for policy makers to place the weightings in the opposite

relationship to Edison's prescription and the empirical evidence of relative importance. Yet this is just what most innovation policy-makers, in most developed economies do. They devote the vast majority of their efforts to examining, explaining and extolling the invention process of innovation (the inspiration zone, where technical expertise and creativity are the drivers) and lay only a small fraction (if any) of their analytical attention and the taxpayers' money upon enhancing skills and performance of the entrepreneurial process (the perspiration zone, where evaluation of opportunity, psychological commitment, and management skill are the drivers). This distorted emphasis repeats itself constantly as allegedly 'new and fresh' innovation policies are introduced by newly elected governments. But the policies are always old and stale. To me the phenomenon resembles the cyclical re-invention of broken wheels. In Australia, at state and federal level, I have spent 25 years of close observation of alleged 'innovation' policy-making based on the durably false premise that invention equals innovation. Working alone and with colleagues, especially Dr John Yencken, I have published extensively in the area of innovation policy with special emphasis on Australia (Gillin, Hindle and Sheddon 1991; Hindle & Gillin 1991; Hindle & Yencken 2001; Hindle 2002; Hindle & Yencken 2004; Yencken, Rushworth, & Hindle 2004; Yencken and Hindle 2005; Hindle 2006; Yencken, O'Connor and Hindle 2006; Hindle 2007; Yencken and Hindle 2008). Knowing that boiling blood is bad for the health, I have tried to remain calm while trying to fathom why the innovation-equals-invention myth is never supplanted in the corridors of policy making. The best I can manage is to suppose that this grievous error is explicable, if not defensible, on the simple grounds that, as Edison might have put it, inspiration is vastly more appealing than perspiration. So, it often receives disproportionate attention. The issue cannot be underlined heavily enough: it really is the fundamental problem at the heart of what is called 'innovation policy' but is often little more than more money for basic research in the hope that economic value will somehow, just happen.

In Australia the evidence of this dominating distortion is abundant. As just one example, when Victoria's Bracks government was newly elected, it quickly produced and proudly announced its new 'innovation policy'. Analysis of the loudly trumpeted 900 million dollar 'innovation' budget (Yencken, O'Connor and Hindle 2006) quickly and clearly revealed that less than one third of one percent of it could be remotely connected to entrepreneurship or any form of support for any sort of commercialisation processes whatsoever. All the rest of the money – 99 and two-thirds' percent - was money for invention: creating new knowledge. In this case of a 'bold, new innovation initiative', inspiration was favoured over perspiration in even greater than inverse proportion to Edison's edict. The implicit assumption, throughout the policy document and the glossy promotional brochure accompanying it, was that, somehow, great new technology, invented in the wonderful State of Victoria under the auspices of government beneficence, would commercialise itself and add value to the State and its citizens. By implication, well-funded inspiration would remove any need for any entrepreneurial perspiration. Sadly, at national and regional level throughout the Western world – not just in Australia – alleged innovation policies such as this one are the norm, not the exception. One supposes that Thomas Alva Edison, in his grave, must be either shrugging with resignation or tearing his hair out.

Many astute commentators before and after Edison have warned of the danger of being too easily seduced by the attractions of the inspirational, inventive element of the innovation duality. For instance, the August 2002 issue of *Harvard Business Review* had innovation as its theme. Within that issue, Theodore Levitt criticised the 'creative types' who think that coming up with a bright idea is the start and finish of innovative responsibility. The problem occurs in industry and within firms, not just in the field of government policy. Levitt argued:

By failing to take into account practical matters of implementation, big thinkers can inspire organizational cultures dedicated to abstract chatter rather than purposeful action. In such cultures, innovation never happens – because people are always talking about it but never doing it. (Levitt 2002: p137)

Levitt's views comport fully with my published critique of Australia's alleged national innovation policy under the Howard federal government (Hindle 2002). The article demonstrated that, despite all the summits and high-flown rhetoric surrounding innovation that had occurred in the corridors of public policy under the Howard government, Australia really did not have an innovation policy.

'Innovation policy' in Australia is currently a misnomer. What is currently called 'innovation policy' (most particularly as represented by the Innovation Summit initiatives and the government's statement, Backing Australia's Ability[DITR 2002a], is not really about innovation in its fullest sense. It is about Research and Development (R&D) in quite a narrow sense. And it is more about research than development, and more about basic research in the physical sciences than applied research in a range of disciplines. Somewhere in the Summit process, the 'innovation policy' label has been usurped and misapplied. What is now classified as a national 'innovation policy' might more credibly be labelled 'more-money-for-research-under-another-name' policy. (Hindle 2002:53)

The article (Hindle 2002: *passim*) went on to say that if innovation is to produce value, entrepreneurial capacity is *the* key issue: for practitioners, researchers and policy makers. However, in the Australia of 2002, neither the public, nor the majority of policy makers understood this fact. In Australia, there was and there remains appalling ignorance about the dualist nature of innovation.

The evidence of public ignorance about innovation in Australia is alarming. In 2002, the National Innovation Awareness Council (NIAC) commissioned a survey to investigate public awareness and perceptions of innovation in Australia (DITR 2002b). For the purposes of the study, respondent demographics were distinguished into four distinct group classifications: 'youth' (students aged 13 to 21); 'parents of students in full-time study'; 'educators and career advisers' and 'proprietors of small to medium size enterprises (SMEs)'. The survey confirmed that the majority of Australians were able to offer some kind of definition of 'innovation' (though a sizable minority, particularly and alarmingly among students, could not). Degree of definitional emphasis differed marginally between the four groups, but the most common concepts associated with 'innovation' were:

- New ideas (topped the list in all four groups);
- New ways of doing things (in top 3 in three out of four groups);
- New technology (in top 4 in three out of four groups);
- Creativity (in top 4 in three out of four groups);

Only one of these concepts – new ways of doing things – even remotely embraces the concept of achieving a tangible, *economically valuable* outcome. The rest focus on the idea-generation, new knowledge, inspiration, invention component of innovation. Clearly, for most Australians, what Edison called inspiration – new knowledge creation - is so much more appealing than perspiration – otherwise known as the entrepreneurial process - that innovation is not really understood at all.

It is therefore not surprising that politicians and policy-makers – who are answerable to a public that basically does not know what innovation is - have not focussed on the sweaty, smelly hard graft of the entrepreneurial process. Instead, advised largely by white-coat scientists from government and industry – whose understanding of and interest in entrepreneurship may not be all that different from members of the general public, all Australian governments prior to the Rudd government have made ‘innovation policy’ synonymous with ‘invention policy’ and left out entrepreneurship virtually altogether. This has been done despite expert opinion (congruent with both theory and international best practice) that, in the context of innovation, the lack of entrepreneurial understanding and capacity is a far bigger problem for contemporary Australia than is knowledge creation and idea generation. However, if ‘innovation policy’ is ever to become reality rather than rhetoric in Australia, some government and some set of public policy makers somewhere in the system are simply going to have to get sweaty. Perspiration is less appealing than inspiration. But it is more important. Entrepreneurial process is more difficult to comprehend than inventive process. But it is more important.

Until someone of significant influence in the policy community has the leadership courage to see and pursue the value of perspiration - the value of entrepreneurial process properly understood - Australia will never have a true innovation policy.

The objectives and design of this paper

The essential message of this paper can be stated simply in three sentences.

- (1) Innovation results when two distinct sub-processes – invention and entrepreneurship - are combined.
- (2) The invention process can be broadly defined as the application of skill and inspiration to produce new knowledge.
- (3) Entrepreneurship can be conceptually defined as a three-phase process (evaluation, commitment, management) that transforms the potential value of new knowledge into realized economic value for defined stakeholders.

Given the space constraints imposed on this article, the choice has been made to concentrate attention on summarising the entrepreneurial process and its importance to innovation policy and avoid any detailed elaboration of the invention process. The paper proceeds as follows. A very brief overview of the invention process is followed by a moderately detailed summary of Hindle’s (2008) model of entrepreneurial process. With an understanding and formal articulation of entrepreneurial process it becomes possible to focus on the key issues that ought to inform the development of innovation policy. These key issues are discussed and the paper concludes where it began by emphasising the need to build innovation policy on the explicit recognition that innovation results from the blending of two processes, invention and entrepreneurship, and that viable innovation policy can never be created unless entrepreneurial process is properly understood.

The physics of inspiration: acknowledging the importance of the invention process

As previously stated, the invention process can be broadly defined as the application of skill and inspiration to produce new knowledge. I rest content with a very brief amplification of only two aspects of the inventive process. First, there can be no innovation without the creation or discovery of some piece of new knowledge, some *invention*, capable of inspiring someone to think that value may flow from it. Second, the creation of new knowledge is highly context specific. For instance, both the established rules and the serendipitous inspiration for the discovery of new knowledge will be different in the software industry than in the fast food industry.

Given this context dependency, the best generalisation that can be made about the invention process – what one might metaphorically call the ‘physics of innovation’ - is that it that every invention process is a blend of four principal components:

- existing knowledge (current expertise in a given area);
- the conscious search for new knowledge (research);
- the serendipitous (not consciously sought) discovery of new knowledge and
- creativity.

This paper has no scope for or desire to go into deep discussion of these four components either separately or in the combination that makes of them an inventive process. The literatures of knowledge creation and creativity abound and are easily discoverable. Besides, this paper’s principal mission is to redress an imbalance by concentrating on explaining entrepreneurial process, which is far less understood than inventive process. As previously and subsequently discussed, innovation policy and what might be called ‘the innovation debate’ is already overbalanced in favour of detailed treatment of the invention process. They virtually ignore entrepreneurial process. So, in this paper, I rest content with the statement that invention – the creation of new knowledge - is the vital predicate process in the innovation duality. Without some new knowledge, possessed of some latent potential to be turned into economic value, there can be no innovation. For innovation, invention – like entrepreneurship – is necessary but not sufficient. However, since there is already a vast amount written about creativity, new knowledge discovery and associated topics (the physics of the invention process) I move now to a summary explanation of the component of innovation that is less discussed. I move to the unfashionable sweaty bit.

The chemistry of perspiration: modelling the entrepreneurial process

Pedicate: entrepreneurship inside and outside the innovation context

Davidsson (2003, 2004) has distinguished two principal schools of thought within the entrepreneurship discipline: the ‘emergence’ perspective (Katz and Gartner 1998; Gartner 1985, 1989, 1990, 1993) and the ‘opportunity’ perspective (Shane and Venkataraman 2000). The latter argued, following Casson (1982), that the truly distinctive characteristic of entrepreneurship lies not in the act of organisational creation and development but in the management of entrepreneurial opportunities.

We define the field of entrepreneurship as the scholarly examination of how, by whom and with what effects opportunities to create future goods and services are discovered, evaluated and exploited. (Shane and Venkataraman 2000: 218).

Of fundamental importance to the opportunity perspective of entrepreneurship – the perspective associated with innovation - is that entrepreneurial opportunities involve the discovery and evaluation of *new* relationships between means and ends. This is quite distinct from improvement or optimisation within existing means-ends frameworks. Functionally, opportunities are defined as ‘situations in which new goods, services, raw materials, markets and organizing methods can be introduced through the formation of new means, ends, or means-ends relationships’ (Eckhardt and Shane, 2003: 4). Figure 1, originated by Klyver (2005) and developed by the present author (Hindle 2007), is a device for clarifying the distinctions between the two contending schools of thought on the nature of entrepreneurship.

		Principal Action Focus	
		Creation of new means and ends relationships	Maximising existing means and ends relationships
Organisational Context	New Organisations	(A) Innovation oriented venture creation	(B) Non-innovation oriented venture creation
	Existing Settings	(C) Innovation oriented venturing in existing contexts (e.g. corporate venturing; licensing via markets etc)	(D) Traditional Management

Figure 1 Distinguishing the two main perspectives of entrepreneurship

Sources: Klyver 2005; Hindle 2007.

Figure 1 illustrates two main dimensions distinguishing the emergence view from the opportunity view. Quadrant *D* is not entrepreneurship from either the opportunity or the emergence perspective but the realm of traditional management. The ‘emergence perspective’ as a school of thought embraces activities lying in quadrants *A* and *B*. The ‘opportunity perspective’ embraces activities lying in quadrants *A* and *C*. Clearly the emergence view deems the evolutionary and dynamic aspects of entrepreneurship to be crucial. The focus is on organising activities in a Weickian sense (Davidsson 2003).

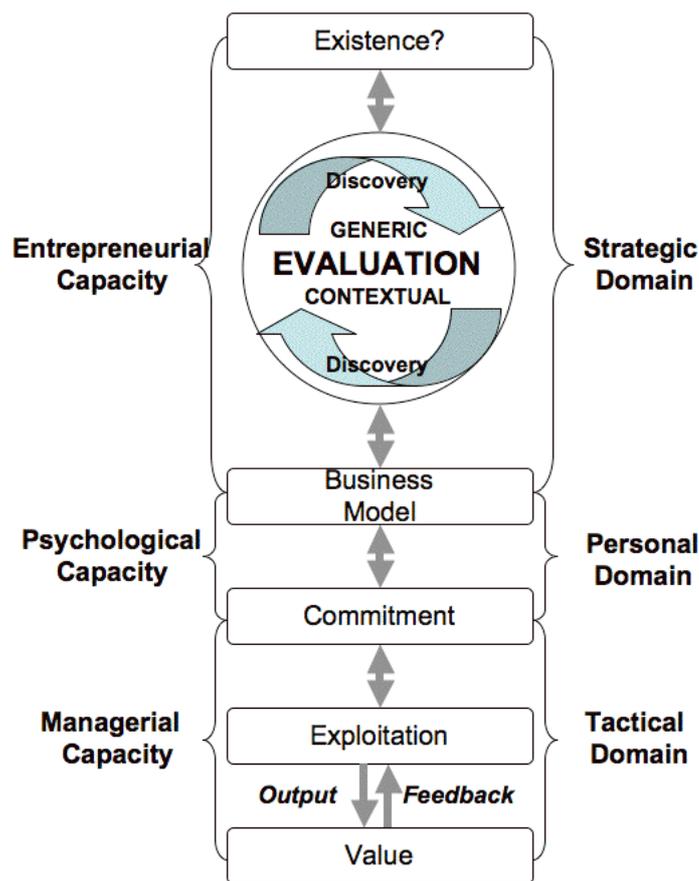
The opportunity view essentially argues that entrepreneurship is about the discovery, evaluation and exploitation of *opportunities* whatever the organisational mode of pursuit. The opportunity school is thus closely associated with the Schumpeterian tradition (Schumpeter, 1912 and 1942) emphasising entrepreneurship as a disequilibrium activity closely associated with value creation in an innovation process and economic theories of endogenous growth (Romer 1990, Helpman 2004, Warsh 2006). The model of entrepreneurial process about to be presented in the following sections of the paper applies equally to both the innovative and non-innovative contexts of entrepreneurship. One can have invention without entrepreneurship and one can have entrepreneurship without invention. Only when both processes interact does innovation result.

The model of entrepreneurial process (MEP)

In a paper entitled ‘First among equals: the primacy of evaluation skills in entrepreneurial process’, (Hindle 2008), I have developed a generic conceptual model of entrepreneurial process (MEP). The model has been submitted to empirical scrutiny in a further paper (Hindle 2009). The MEP is replicated in this paper in summary form.

In the original paper, I reviewed the literature of entrepreneurial process and found that, despite a high volume and a wide variety of writing about various aspects of the topic from the early 1970s until 2007, there was and is, amazingly, a total absence of any prior, formally-stated, conceptually-integrated, process model capable of representing the set of activities involved from the origin of entrepreneurial initiative (discovering and questioning the existence and viability of an opportunity) to the ultimate creation of measurable value based on that evaluated opportunity². The MEP is empirical in nature, practice oriented and satisfies Karl Popper’s famous mandate that any theory (in this paper I use the words ‘theory’ and ‘model’ interchangeably) worthy of the name ought to be fabricated in such a way that it is capable of falsification. Empirical scrutiny (Hindle 2009a) has supported the contention that, at a broad level of generality, the MEP is an accurate *conceptual* representation of the key activities and relationships involved in any actual or conceivable, real-world, entrepreneurial process. Figure 2 (reproduced from Hindle 2008) is a diagrammatic representation of the conceptual model of entrepreneurial process (MEP).

**Figure 2. A generic conceptual model of entrepreneurial process
(Source: Hindle 2008)**



² The paper (Hindle 2008) argues that the many forms of so-called ‘stage models’ of entrepreneurship are not true process models, merely ex-post summary classifications of alleged temporal clusters of activity.

Overview

In summary, the model conceptualises the entrepreneurial process as a set of activities that takes purposive actors (entrepreneurial protagonists) from a starting point of questioning whether an opportunity to create value for themselves or other defined stakeholders exists, to an end point where measurable value (positive or negative) is ultimately achieved. In the case where entrepreneurship is operating in an innovative context – as the entirety of the paper to this point bears witness – the opportunity under consideration is the output of the inventive process (i.e. some ‘invention’ or ‘new knowledge’ that has technical efficacy but as yet no demonstrable economic value).

To get from initial input (questioning whether the opportunity to create value actually exists) to final output (the creation of tangible economic value), the entrepreneurial process embraces three distinctive but inter-related categories, or domains of activity: the strategic, the personal and the tactical. An important point to realise is that not everything about the practice of entrepreneurship is uniquely a function of specifically entrepreneurial expertise, just as not every aspect of the practice of medicine is uniquely a function of specifically medical expertise.

Just as the full process of practising as medical doctor or a lawyer involves more than the skills that uniquely define medical capacity or legal capacity, so the full process of entrepreneurship involves more than the skills that uniquely define entrepreneurial capacity. I argue elsewhere in detail (Hindle 2008) that the area that uniquely warrants the title ‘entrepreneurial capacity’, resides in the strategic domain of the entrepreneurial process and concerns the task of evaluating an opportunity. I maintain that entrepreneurial capacity is the ability to design an efficacious transformation, via evaluation, from querying the efficacy of an opportunity to answering that question in the form of a business model. This set of evaluation activities is what is unique to the entrepreneurial process. However, just as doctors and lawyers must perform a range of non-unique activities in order to practice medicine or law (for instance, communicate with people, manage their time and their business enterprises) so the protagonist of an entrepreneurial process must perform a range of activities and have or acquire relevant skills that are classifiable under the headings of personal capacity (the ability to make the necessary commitment) and managerial capacity (the ability to implement the business model once commitment has been made).

Though the model presented in figure one looks very stylized and linear, it must be remembered that it is a *conceptual* model: not a map of any actual ‘on the ground’ entrepreneurial process. The model is not naively positing that entrepreneurship, in practice, is a simplistic, linear, sequential process. Any actual, real-world entrepreneurial process will, of course, involve a very un-linear – ‘messy’ - unfolding of activities that ‘jump around’: a bit of evaluation here; a bit of commitment there; a bit more evaluation; some management activities prior to business launch; stronger commitment; and so on. Perspiration is messy stuff. In real time and in the hands of real people, the components abstracted and depicted in the conceptual model of entrepreneurial process (Figure 2) occur in very untidy iterations and interactions. However, it remains desirable for the analyst of any process, while recognizing the reality of mess, to seek clarity in conceptual depiction.

Accordingly, what is presented is a model of entrepreneurial process, that proceeds in three distinct conceptual stages from the questioning of the economic value inherent in an opportunity to the realisation of that value. When the initial opportunity consists of the new knowledge obtained from an inventive process, the combined set of activities can be called innovation. A little more detail on

each of the three conceptual stages of the entrepreneurial process is provided in the following sections.

The strategic domain: where entrepreneurial capacity produces evaluation

DOMAIN: strategy

CAPACITY: entrepreneurial

ACTIVITY: evaluation

In the strategic domain the most important activity (sub-process) is evaluation, which can be defined as the systematic determination of merit, worth, and significance of something or someone using criteria against a set of standards. In the MEP, (figure 2), the graphic presentation of arrows rotating within a circle containing the words ‘generic’, contextual and ‘discovery’ (twice) is designed to indicate that the evaluation process (however performed, in conformance with whatever logic system may be employed by the protagonists), is iterative. In every iteration or ‘turn of the wheel’, ‘evaluation’ is the sub-process and ‘discovery’ is the provisional outcome. Some evaluation procedures are generic. They occur in every entrepreneurial process whether the logic being implied is causal or effectual (Sarasvathy 1998, 2001, 2003, 2004), whether the actors are consciously aware of their evaluating activities and thinking processes or not, whether they use heuristics or formal systems (Mitchell et al. 2007). Further, evaluation procedures occur whether the scope of the opportunity under scrutiny is large or small, involves new venture creation or takes place within existing settings (Shane and Venkataraman 2000). Some evaluation procedures are contextual, and occur only in particular cases: they are entirely dependent on unique circumstances. By way of simple illustration one need only consider the obvious fact that an opportunity based on the viability of a particular invention in the field of nano-technology will involve many contextual evaluative activities that are not required when considering whether or not to open a third sandwich bar to service a large office block.

The result of the combined generic and contextual evaluation activities, after any given iterative cycle, will produce an interim business model. The result after all cycles that the protagonists wish to perform is a final business model. By ‘final’ I do not mean to imply ‘immutable for all time’; simply that the entrepreneurial protagonists, for the time being, have satisfied themselves that they have designed a recipe for value creation that is sufficiently well-articulated as to be potentially exploitable. Elsewhere, I have defined business model as ‘a well-articulated plan for turning effort into profit using identified resources and stakeholders’ (Hindle 2004: 275). However, the conception of ‘business model’ in my (2008) MEP argument can be more flexible. The process model being postulated requires only that the result of the evaluation process, however hazy or illogical or implausible it may seem to outsiders, qualifies as a ‘business model’ if it satisfies the entrepreneurial protagonists conducting the entrepreneurial process that it provides them with an answer to the fundamental question: does an opportunity exist that we can potentially exploit? In other words, at this level of generality, ‘business model’ can be defined as an answer to the opportunity existence question wherein the protagonists have satisfied themselves that they have created a design for how to precede to implementation of the opportunity. The prosaics of the situation are: there is an opportunity because, *if we did this*, new value *could* be created.

Once a business model, exists in any format – from a formal ‘well-articulated’ statement on crisp, white paper, to a loosely-conceived set of notions in the head(s) of the protagonist(s) – acceptable to

the protagonist(s), the entrepreneurial process model being posited here argues that, conceptually, it is time to move from the strategic domain to the personal domain where commitment occurs and beyond it to the managerial domain where implementation (exploitation) occurs.

The personal domain: where psychological capacity produces commitment

DOMAIN: personal
CAPACITY: psychological
ACTIVITY: commitment

The MEP is a person-centred process model. The pivotal concept, decisive in determining whether a business model (representing an evaluated opportunity) may go forward to the implementation stage is the *commitment* of the entrepreneurial protagonist, individual or team. A short definition of commitment for the purposes at hand is ‘the pledged willingness of defined actors to undertake obligations and their consequences’. Personal commitment is the act or quality of voluntarily taking on or fulfilling obligations. What makes personal commitment ‘personal’ is the voluntary aspect.

There are many extant theories of commitment, most derived from the parent field of psychology. Scholars particularly helpful in understanding the process of personal commitment include: Foote (1951); Burke and Reitzes (1991); Becker (1960); Stryker (1968), and Kanter (1968; 1972). For the purpose of understanding entrepreneurial process, there are two key issues. First, it is not necessary to rely on the intuitively obvious proposition that without commitment by the entrepreneurial protagonists, an entrepreneurial process will not proceed. There is a deep body of scholarship providing theoretical and empirical evidence on the way in which commitment is enacted with respect to activities and this can be applied to the case of pursuit of an entrepreneurial opportunity and so provide support for the model of entrepreneurial process. Second, though the act of commitment is essential to the entrepreneurial process, it is not unique to it. So much for commitment: but neither evaluation nor commitment completes an entrepreneurial process: more remains to be done.

The tactical domain: where managerial capacity produces economic value

DOMAIN: tactical
CAPACITY: managerial
ACTIVITY: value achievement

It is not sufficient to commit to pursuit of an opportunity via the evaluation embodied in a business model: one has to proceed to exploitation, the fourth of Shane and Venkataraman’s (2000) four dimensions of opportunity. This domain involves the managerial skills necessary to actually implement the business model. To provide guidance and wisdom in this tactical domain, the practitioner, researcher and policy-maker have available the entire pantheon of the vast literature of management – quite apart from a substantial body of entrepreneurship literature that has focused upon a wide range of issues devoted to opportunity exploitation.

Summary

The model of entrepreneurial process illustrated in figure 2 argues that exploitation of an opportunity involves moving from commitment to pursue the opportunity (as embodied in an evaluated business model) to the actual achievement of value. The dual direction arrows between exploitation and value (and thence to all other components of the model) indicate that the process will encompass feedback, via monitoring. Once value, (positive or negative, adequate or inadequate) is achieved, the entrepreneurial protagonists, (who can be classified as ‘the innovators’ in cases where the entrepreneurial opportunity arises from an invention process), can consider the efficacy of the exploitation regime they have chosen and implemented and begin a process of re-assessment (working back through the model). The entrepreneurial process can thus either replicate itself or transform into a process of managing a now established system (whether that be as a newly developed venture or through some other system of value creation postulated in the business model).

The conceptualisation of the generic model of entrepreneurial process is thus complete and the paper turns now to address the policy implications that flow from a better conceptualisation of innovation than has previously informed the policy-making arena.

Key issues in innovation policy

Is no policy better than any?

Emanating from the right wing of the political spectrum, there is no shortage of argument that the deployment of any public funds in any of the areas of science, innovation, technological development and regional development serves no purpose other than to undermine the competitive operation of markets. A particularly entertaining, if not convincing argument in this genre comes from Terence Kealey, a clinical biochemist at the University of Buckingham, who aims to destroy what he thinks of as the myth that the advancement of scientific learning depends in any way on government intervention. Kealey (2008) disagrees that science leads technology. He contends the opposite is true. The great inventors in Britain’s industrial revolution, including the steam-engine pioneers Thomas Newcomen and Richard Trevithick, were not fellows of the Royal Society. They were barely literate artisans who found intuitive solutions to practical problems (in Newcomen’s case, how to remove water from Cornish tin mines). Technological breakthroughs often lead scientific development, not vice versa, Kealey argues. At the moment of its invention, the steam engine designed by James Watt disobeyed the laws of contemporary physics. Meanwhile, scientists have long claimed that science was suffering from the lack of public funds. In 1830, Charles Babbage, the supposed father of the computer, published *The Decline of Science in Britain*. But the following year, as Kealey points out, Michael Faraday discovered electromagnetic induction and Charles Darwin boarded HMS Beagle. The great advances of Victorian science occurred without government support. With humour, enthusiasm and nearly-convincing argument, Kealey is in the vanguard of a long line of admirers and followers of Adam Smith (Kealey’s hero). In *The Wealth of Nations*, Adam Smith claimed that the public interest was best served when the government ceased attempting to direct the economy. Kealey concentrates his extension of this basic argument on the world of science, which, like that of commerce, involves much “truck, barter and exchange”.

It is unlikely that many OECD-nation governments, in the current aftershock of recent, world-wide financial market meltdown will or should abandon the fields of science and innovation policy on the polemical advice of unfettered believers in the free market such as Kealey, let alone heed the anti-Keynsian advice emanating from such right wing think tanks as The Heritage Foundation (www.heritage.org) of the USA. It publishes articles such as Reidl's (2006) *Why Government Spending Does Not Stimulate Economic Growth*. However, policy makers would do well always to state and to challenge the assumption that well-meant policies will necessarily have desired or desirable results. This is particularly so in the areas of science aid, R&D support and innovation policy. The OECD (2003) has published a massive, dispassionate, detailed, evidence-based book dedicated to answering the question: What makes some countries seemingly able to thrive on new technological opportunities while others are held back? (OECD 2003: 3). The OECD researchers found positive association between private R&D expenditure and negative effects in the case of publicly funded R&D. Does this mean commentators like Kealey are right and governments should abandon science policy and innovation policy? The authors had this to say (OECD 2003: 34-35):

The negative results for public R&D are surprising and deserve some qualification. Taken at face value they suggest publicly-performed R&D crowds out resources that could be alternatively used by the private sector, including private R&D. There is some evidence of this effect in studies that have looked in detail at the role of different forms of R&D and the interaction between them. However, there are avenues for more complex effects that regression analysis cannot identify. For example, while business-performed R&D is likely to be more directly targeted to improvement in productivity, other forms of R&D (e.g. energy, health and university research) may not raise technology levels significantly in the short run, but they may generate basic knowledge with possible "technology spillovers". The latter are difficult to identify, not least because of the long lags involved and the possible interactions with human capital and associated institutions.

What should be made of all of this? Well, I cannot agree that a complete abandonment by government of science and innovation funding would be either prudent or justifiable. Nor do I think that a vague hope for long term benefits is sufficient reason to dismiss concerns about the medium term conspicuous failure of R&D and innovation policy in the OECD nations, including Australia. I do believe that the evidence that seemingly argues *against* government support for R&D is, properly conceived, evidence *for* the argument that dominates this paper. Funding only the creation of new knowledge – i.e. only the invention process – is a distortion of what needs to be done to have a true innovation policy. If the entrepreneurial process were to receive at least some policy attention and public funding support as part of a more balanced innovation policy, perhaps the returns to public support of the invention process would start to appear in the statistics. Policy-makers need to help their citizens to become better at the entrepreneurial process. That will lead to better utilisation of and value from the inventive process. In short, innovation policy must include not exclude entrepreneurship policy.

Redress the imbalance

It is beyond the scope of this paper to suggest any specific entrepreneurship policy initiatives. It is within the scope of this paper to warn Australia's policy makers that ignorance of necessity is no excuse for failure. There is a strongly emerging research literature, specifically devoted to entrepreneurship policy and it is being taken very seriously in Europe and North America. See, for

instance, Audretsch, Thurik, Verheul and Wennekers (2002), Hart (2003) and Holtz-Eakin and Rosen (2004). This research and the example of overseas policy practice would give Australian policy makers exactly the same message as this paper has presented and exactly the same message as OECD funded statistics on invention-only policy contain. Innovation policy in the absence of entrepreneurship policy does not work. Inspiration without perspiration never creates value. Policy makers must redress the imbalance or continue to waste tax-payer dollars and fail in their sanguine hopes.

The unaddressed contextual issue: regionality and community

Context always affects process, whatever the subject matter. Examples abound. A great surgeon cannot operate effectively in a bombed hospital; a great legal argument cannot succeed in a corrupt court; a great entrepreneurial business plan cannot be developed, committed to or successfully implemented in an unreceptive or inappropriate region or community. A serious omission forced on this paper by space constraints concerns the importance of context to entrepreneurial process. I have addressed this elsewhere (Hindle 2009b), in a paper to be published in the journal *Entrepreneurship and Regional Development* in mid 2009 and entitled, *How community context affects entrepreneurial process: a diagnostic framework*. The framework facilitates the assessment of four aspects of any community or region as an entrepreneurial context. It provides an analyst with the ability to produce the following:

- (1) a general assessment of the entrepreneurial potential of the whole community in its current state;
- (2) a specific assessment of the technical and contextual viability of any proposed entrepreneurial initiative by any set of community actors given the current status of community development;
- (3) the ability to articulate the foundations for design and execution of entrepreneurial projects (physical, institutional and educational) that are both feasible and desirable for a range of entities who are community members (this importantly implies the opposite: the ability to recognize and reject inappropriate entrepreneurial initiatives before resources are wasted in pursuing them);
- (4) the ability to identify the focal areas where facilitations and programs of varying kinds might be created to enhance the existing resources and skills of various community members and institutions so that desired initiatives, which are not feasible at present, may become feasible in future.

In the current paper there is no scope for elaboration of the importance of regional/community context to the construction of sound innovation/entrepreneurship policy beyond saying that context must be overtly addressed and the diagnostic framework exists to make entrepreneurship policy context sensitive.

Conclusion: innovation one, two, three

This paper has presented and explored a brief, unambiguous, comprehensive and, as it turns out, relatively uncontroversial definition of innovation.

Innovation is the combination of an inventive process and an entrepreneurial process to create new value for defined stakeholders.

This definitional simplicity establishes what might be thought of as the ‘one, two, three’ for understanding the relationship between innovation and entrepreneurship.

Innovation is ONE word but involves TWO distinct processes, invention (which blends knowledge and creativity) and entrepreneurship, which is a blend of THREE key activities: opportunity *evaluation*, psychological *commitment* and implementation *management*.

In understanding the relationship between innovation and entrepreneurship most previous policy problems have arisen from failure to adequately spell out the distinction between two processes – the invention of something of potential economic value, versus the transformation of that potential into actual economic value. Definition and understanding are jeopardised when we fail to call the second process, explicitly, ‘entrepreneurship’ (calling it something much vaguer, for instance ‘implementation’ or ‘commercialization’). Clarity is further blurred when we misunderstand the nature of the entrepreneurial process itself. Every entrepreneurial process is always a particular, complex and imperfect blend of evaluation, commitment and management.

National, public innovation policy is made impossible if we forget the fundamental duality: innovation equals invention plus entrepreneurship. If the entrepreneurship component of the equation is forgotten altogether or relegated to either insignificance or the facile assumption that it will happen automatically if only the invention is good enough, we no longer have an innovation policy. We have a taxpayer-funded misconception. However, **based on** the research-based understanding of the nature of innovation offered in this paper, the national approach to innovation policy can be improved vastly and quickly. Is there any chance of a new wheel, or will we continue to reinvent the old, broken one, despite the statistics telling us that there is no value to be gained, only taxpayers’ money to be lost?

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